

NOTES & Correspondence
MYSORE GOVERNMENT SECRETARIAT

File No. POD 18-04758

Department of Public Works

Section Electrical

Subject: Sharda H.E. Project - 14
documents re Turbine
ordered on 14/5 1957

References: Letter No. C-1309 dated
15th November 1957 to
the G.O. H.O.

Date	To whom sent	Notes and instructions
		<i>Handwritten:</i> 17.11.58 / 3259 / L.H.

File No. _____ of 195 _____
U.O.T. No. 199/58-59 Dated 19-11-58

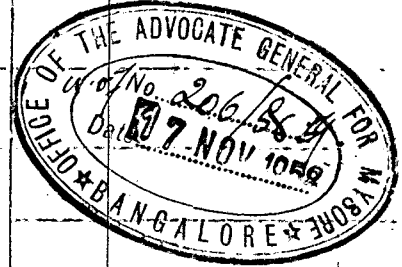
Mysore Government Secretariat

146

3) I have made some changes in the Drafts and explained the changes to the Executive Engineer, Hydro electric Construction who met me.

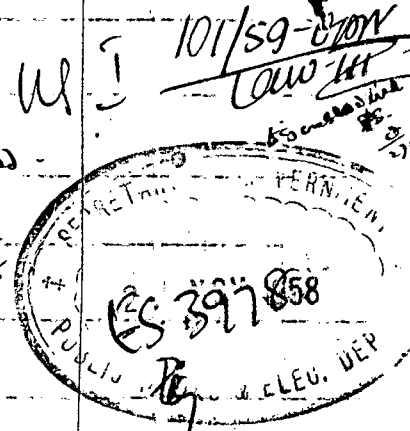
4) ~~Nothing~~ was discussed personally with the D.S. & E.E. as per minutes of 17/11

M Chandrabhatla
H.C. - Joint Pleader
19/11/58



5) The draft deeds are scrutinised.

A. Mahanna
27/11/58
120D) 19/11/58



10) Draft of a letter to the Govt. H.C.P. are put up for approval.
5/11

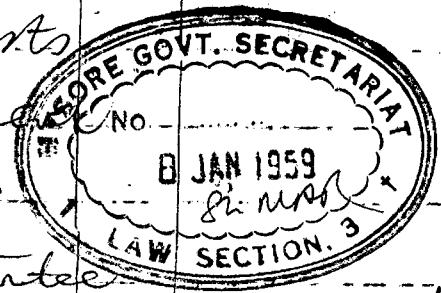
11) Done.
12/11

Issued on 5/12/58.

Letter No G/1434 dated the 2nd January 1959 from the Chief Engineer, H.C.P.

Requests for approval to the revised draft agreement form.

12) The Company requests that sub-clause (b) of the agreement be amended to be in line with that given in the Bank guarantee to be given by the Bank of Mysore. The file will now be sent to the Law Dept. for opinion.



F.N. 096/Lian
Sec III of
7-1-59

6/1/59 (d.s.)
16/1

Chadra #2 Project

Mysore Government
Secretariat

File No.

of 195

[App. F. III 2

7

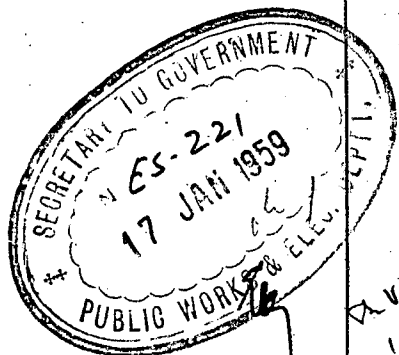
Serial
No.

F.No. 96/101/59-OMV
Law III



8m N.P.H. vs 1

1054(A)



21/1/59

14) ~~Letter~~. His arrival with the ad. personally -
- he felt left with him for security as opinion
and when required.

P. Chandraiah
13/1/59

vs 1/1/59

15) U.O.T. NO. 253/689. 16-1-59
I have seen the sheet intended to be substituted for
the page 2 of the earlier draft. I have made a
few changes and pinned this sheet to page 3 of the file.

W. Chandraiah
H.C. Dept. 1/1/59
16/1/1959

16) P. Chandraiah
16/1/59
vs 1/1/59

(15D)

17) A draft letter to the
G.E. & C.P. for
approval.

18) Done
16/1/59

19/1

Issued on 20/1/59

Letter No. G-1696 dated the
21st January 1959 from the
Chief Engineer, A.C.P.
Requests for the insertion
of the word "last" in the
clause.

19) He has inserted the
word "last" in the final contract
agreement document. & vs

u

File No. 321 Law (423-III) of 1951.

Mysore Government
Secretariat

Serial
No.

suggestion may be accepted. L.D.
may also see.

20) L.B. may please see
23/1/59
Reg 20/1

21) Key be accepted. Please
reference to the C.I. which is to be along with

P.D.)

P. H. L. L. L.
29/1/59
L.S. 2/1/59

22) The L.B. H.C.P. has noticed
of the insertion of the word
"last" in the agreement, for
the information of Govt. For
approval is required. May
perhaps be recorded.

21/2/59

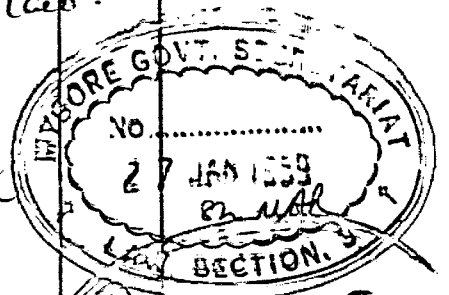
Reg 21/2

Pl. see F.N. 96
also

F.N. 321/1/59
Sec. III

24-1-59

423/59-010W
Law-III



S.S. 335
1959

64

13

2
3/5

GOVERNMENT OF MYSORE.

File No.

Telegraphic Address: "GOMED"

In Reply Refer to

No.

Encls.

Codes Used:

BENTLEY'S LIEBER'S

A. B. C. 6th EDITION

BUSINESS TELEGRAPH CODE

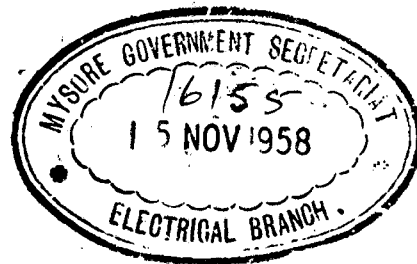
OFFICE OF THE
CHIEF ENGINEER, HYDRO-ELECTRIC
CONSTRUCTION PROJECTS,
POST BAG NO. 60,
RACE COURSE CROSS ROAD,

Bangalore-1, 15th November 1958
(Mysore, S. India)

The Secretary to Government,
P.W. & Electricity Department,
BANGALORE.

S i r,

Sub: Bhadra Hydro-Electric Project - Contract
documents for Turbines ordered on M/s.
Neyrpic, France and Transformers ordered
on M/s. Ansaldo, St. Georgea, Italy.



I wish to enclose herewith draft contract documents
for the above and would request you kindly to convey approval
for these drafts at an early date since the Bank guarantee
letters have to be opened immediately.

Yours faithfully,

H. Narayana Rao
(H.V. Narayana Rao) 15/11/58
CHIEF ENGINEER, H.C.P.

Instructions of the Secy P-5+2
May be sent to
S.O. immediately &
their advice obtained

13/11/58

THIS agreement made this.....day of.....1958

~~Given~~ Establishments Neyrpic, Avenue De Beauvert, Grenoble, France (hereinafter referred as the "Contractor"), which term shall include ^{its successors} ~~his heirs~~ and legal representatives and the Governor of Mysore (hereinafter called the "Government").

And whereas the Government having invited the tenders in Stores Purchase Committee Enquiry No.14919 for the supply of "Hydraulic Turbines, Valves, Automatic Governors and Associated Equipment" for Bhadra Reservoir Hydro-Electric Project and the contractor having offered to supply certain equipment in his ~~its~~ letters.-

1. No.T-529/1616 dated 7th May 1957
2. No.EB-PFa/GPB dated 4th October 1957.
3. No.T-529/4560 dated 11th November 1957
4. No.T-529/6542 dated 9th December ~~1957~~ 1957
5. No.T-529/8674 dated 14th December 1957
6. No.T-529/8766 dated 7th January 1958.
7. No.EB-PFa/ABO dated 29th May 1958.

And whereas the Secretary, Stores Purchase Committee on behalf of ~~the Chief Engineer, Hydro-Electric-Construction-Projects of Mysore hereinafter called the "Chief Engineer" and on behalf~~ of the State having placed an order with the Contractor for the supply of Hydraulic Turbines, Valves, Governors and associated Equipment for the Bhadra Reservoir Hydro-Electric Project in BPC/EI.48024 dated 6th January 1958 as detailed in the Schedules described hereinafter and the general conditions and specifications detailed in the said Enquiry No.14919 and the Schedule of Deviations annexed.

And whereas the contractor having accepted to supply the Hydraulic Turbines and associated equipment, as herein described in the schedule and having furnished a security deposit of Rs. for the fulfilment of the contract.

It is agreed between the parties hereto as follows:-

→ The security deposit furnished by the contractor shall be forfeited at the discretion of the ^{Government} ~~purchaser~~ in the event of non-fulfilment of any of the terms of this contract.

.....2/

1. The contractor shall supply the goods detailed in the Schedules hereunder and the description and quality of the goods shall be as ⁱⁿ the Schedule. The Government shall pay the contractor for the goods ^{delivered} at the prices stated in the Schedule.

3. In consideration of the Contractor having agreed to supply the above mentioned equipment, the Government shall make payments as follows:-

- a) 30% of total F.O.B. price of the order under this Contract pro-rata of the value of each consignment against presentation of shipping documents.

Within _____ months from 17-7-1958 the Government shall open an irrevocable letter of credit in Chase Manhattan Bank, Paris (A French Bank in Paris) for 30% of the total F.O.B. price of the order. The letter of credit shall be valid for a period not less than the delivery periods stated hereunder and shall be extended, if necessary.

Against this letter of credit the Contractor shall present the respective shipping documents, made out "to order" of the Government to the above Bank and the Contractor shall be paid 30% of the invoiced F.O.B. value of each consignment.

b) Balance of 70% of F.O.B. value ^{shall} ^{to the Contractor} be paid ⁱⁿ ten half-yearly instalments ~~detailed as under will carry interest at 6% annum~~ ^{the first} of each instalment being payable 6 months after payment under clause a) above. Such instalments shall carry interest at 6 per cent per annum ^{at detailed below}

<u>Instalment</u>	<u>Interest</u> approximate <u>amount</u>	<u>Approximate</u> Total amount <u>payable</u>	<u>Due date of</u> payment
-------------------	---	--	-------------------------------

1st
2nd
3rd
4th
5th
6th
7th
8th
9th
10th

NOTE: Payments as in 2 and 10 both inclusive shall be made to the Contractor after receipt of shipping documents of the last consignment.

Interest shall be calculated with effect from 17-7-1960 (24 months from the date of receipt of import licence), unless the delivery period is extended by mutual agreement. In the latter event the interest shall accrue from the date inclusive of the extended delivery period in which case payments of instalments 1 to 10 shall be correspondingly deferred. The amounts of interest due shall be payable with each instalment. ~~The Bank of Mysore shall guarantee~~ that the ten half-yearly instalments falling due in the dates stated above shall be paid to the Contractor through their Bankers.

A Bank Guarantee for the deferred amounts and interests thereon shall be provided by the Government in the enclosed form.

IN WITNESS WHEREOF the parties to this agreement have signed this indenture in the presence of the following witnesses.

Contractor

Witnesses:

In the Name of and under the discretion of the Governor

Revised

The Government shall arrange guarantee by the Bank of Mysore Ltd

2 In consideration of the Contractor having agreed to supply the above mentioned equipment, the Government ^{shall} ~~will~~ make payments as follows:-

a) 30% of total F.O.B. price of the order under this Contract pro-rata of the value of each consignment against presentation of shipping documents.

Within months from 17-7-1958 the Government shall open an irrevocable letter of credit in a French Bank in Paris (Chase Manhattan Bank, Paris) for 30% of total F.O.B. price of the order. The letter of credit shall be valid for a period not less than the delivery periods ~~indicated elsewhere~~ ^{stated hereunder} and shall be ~~xt~~ extended, if necessary.

Against this ^{Letter of credit} ~~Letter~~, the Contractor shall present the respective shipping documents, made out "to order" of the Government to the above Bank and ~~the contract~~ shall be paid 30% of the invoiced FOB value of each consignment.

b) Balance 70% of FOB price of the contract in ten equal half yearly instalments, the first instalment maturing 30 months after 17th July

1958, the other nine instalments shall be paid at intervals of 6 months, ^(the first of the said 9 instalments being payable starting 6 months after payment above) however subject to the condition

that the shipping documents of last consignment has been received. ~~the~~ In the event of the delivery period being extended by mutual consent, the payment of instalment shall be postponed by the corresponding period.

Interest at 6% per annum shall be calculated with effect from the date of receipt of ^{the Import Licence} ~~the~~ unless the delivery period is extended by mutual agreement. In the latter event the interest shall accrue from the date inclusive of the extended delivery period in which case the six monthly instalments shall be correspondingly deferred. The amount of interest shall be payable with each instalment.

A Bank Guarantee ^{Government} ~~as~~ in the enclosed form shall be provided by the Purchaser for the deferred amounts and interests thereon.

IN WITNESS WHEREOF the parties to this agreement have signed this indenture in the presence of the following witnesses.

Witnesses:

Contractor.

In the name of and under the discretion of the Governor.

D R A F T.

reference to the contract entered into between ^{the Government of Mysore represented by} The Chief Engineer, Hydro-Electric Construction Projects of Mysore, Purchaser and Messrs. Etablissements Neyrpic, Avenue De Beauvart Grenoble, France, Sellers, for the supply of Hydraulic Turbines, Valves, Automatic Governors and Associated Equipment required for Bhadra Project by the Sellers at a total cost of £ 290,544-0-0 ^{the price} Bidders have agreed to make payments as follows:-

The first payment of 30% FOB prorate value -- against presentation of shipping documents under confirmed irrevocable letter of Credit established with our French Agents in Paris (Chase-Manhattan Bank Paris). Part shipments are allowed.

The balance of 70% of FOB value (amount) to be paid in Ten half-yearly instalments (Ten instalments) detailed as under will carry interest 6% per annum.

Instalment.	Interest approximate amount.	Approximate Total amount payable.	Due date of payment.
1st			
2nd			
3rd			
4th			
5th			
6th			
7th			
8th			
9th			
10th			

Note:- Payments as in 2 to 10 both inclusive shall be made to the seller after receipt of shipping documents ~~and the last consignment.~~ ^{if there}

Interest will be calculated with effect from ^{17-7-1966 (24 months from} ~~24th months from the~~ date of receipt of import license) Unless the delivery period is extended by mutual agreement. In the latter event the interest will accrue from the date inclusive of the extended delivery period in which case payments of instalments 1 to 10 will be correspondingly deferred. The amounts of interest due shall be payable with each instalment. We hereby guarantee that the ten half-yearly instalments falling due on the dates stated above shall be paid to the Sellers by us through their Bankers.

We confirm that we hold an Indian Exchange Permit to remit to Messrs Neyrpic, Grenoble France through their Bankers for all payments against this order as stated above. We further confirm that the above payments with interest will be made to Messrs. ~~the~~ Neyrpic, Grenoble, France through their Bankers at due dates.

This guarantee is independent of any disputes that might arise after the supply of the equipment regarding working of the equipment.

This guarantee shall be irrevocable and shall remain in force until.....1965.

(SIGNATURE OF GUARANTOR).

BSI:JM:

or from the date of completion of delivery of goods whichever is later

1.00 - GENERAL CONDITIONS

The equipment listed below shall be manufactured according to the enquiry specification issued by the Stores Purchase Committee - Section 1 and 2 - Bhadra Enquiry No.14919 unless otherwise modified and accepted by the ^{Government} purchaser in writing prior to placing this order and the schedule of deviation, appended in clause 26.00. The order shall also be subject to the general terms and conditions for delivery, penalty for late delivery, etc., enlisted below. *The General Conditions of contract for supply and Erection of Equipment issued by the Government of Mysore through S.P.C. shall also form part of this contract, unless otherwise modified here under.*

2.00 - SCHEDULE OF THE EQUIPMENT

2.01 - RIGHT BANK STATION & RIVER BED STATION TURBINES:-

Each of the units shall be complete with the following major items and such of the minor items as are not specifically listed - here but are necessary for the satisfactory operation of the equipment covered by this order.

- 1- Stay ring of welded steel plates or of Cast Steel.
- 1- Spiral casing of welded steel plate
- 1- Test ring (common for both Right Bank & River Bed Units).
- 1- Wicket gate operating mechanism consisting of -
 - 1 - head cover with necessary guide bushings.
 - 1 - Bottom ring made of cast steel plate with the necessary guide bushings.
- 24 - Wicket gates of ordinary cast steel.
 - 1 - set of links and levers for the wicket gates.
- 2 - Wicket gate servo-motors
- 2- connecting rods for wicket gate servo-motors
- 1- Regulating ring made of welded steel plate
- 1- Runner cone
- 1- Runner shaft made of open hearth carbon steel with coupling bolts
- 1- Cast steel runner with stainless steel runner blades
 - Mechanism for adjusting the tilt of runner blade
- 1- Runner blade servo-motor with piston and piston rod.
- 1- Dismantling device for the runner (for two units).
- 1- Oil supply head, control valve and blade restoring mechanism.
- 1- Pit lining of the turbine pit in order to provide supports for the wicket gate servo-motors.
- 1- Runner shaft sealing arrangement.
- 1- Turbine guide bearing with -
 - 1 - oil level indicator with low level contacts for alarm.
 - 1 - thermostat relay employing vapour tension system for alarm and shut-down.
 - 2 - temperature detectors

- 1 - Discharge ring of stainless steel construction
- 1 - Draft tube liner with hinged mandoor
- 1 - Draft tube bend until a section where the area is 1.4 times the section at the exit of the cone.

Oil Pressure Governing System:-

- 1 - Actuator complete
- 1 - Permanent Magnet generator
- 1 - Oil pump driven by A.C. motor
- 1 - Standby oil pump conjugating cams and wicket gate restoring mechanism Pressure receiver.
- 1 - sump tank
- 1 - Governor cabinet
- 1 - compressed air equipment (combined with dewatering equipment).

This equipment shall also supply air for the generator brakes in co-ordination with generator manufacture.

Main Inlet Valve:-

- 1 - Valve body either of cast steel or welded steel plate.
- 1 - Valve disc either of cast steel or welded steel plate.
- 1 - Shaft for disc movement
- 2 - Guide bearings
- 1 - Connecting rod
- 1 - Single acting oil servo-motor
- 1 - Counterweight with operating lever
- 1 - By-pass valve of remote control
- 1 - By pass valve for manual control
- 1 - By pass piping.

NOTE: The supply of pipes connecting spiral casing to inlet valve of turbine is not included. However, drawings of the same shall be provided by the contractor free of charge.

Miscellaneous:-

- 1) Compressed air plan for governing installation and depressing water level when operating as a synchronous condenser.

Both for Right Bank River Bed units consisting of pressure receivers, compressed air plant, hydro-ejector and connecting pipes.

11) Drainage equipment:-

Only for River bed units consisting of drainage pumps with motors, float system and connecting pipes.

Choquer plating for the turbines, 2 sets ^{of} for key-boards for tools and special tools common for both the ~~turbines~~ ^{stations}.

2.02 - LEFT BANK STATION:

The supply for this station shall comprise of:-

- 1 - Horizontal shaft Francis Turbine comprsing -
 - 1 - spiral casing
 - 1 - runner of bronze

9)

- 1 - runner shaft
- 1 - head cover
- 1 - bottom ring
- 1 - runner shaft sealing device
- 1 - set of cast steel guide vanes
- 1 - set of bearings for guide vane trunnions
- 1 - set of links and levers
- 1 - regulating ring
- 1 - Double acting oil servo-motor
- 1 - connecting rod
- 1 - turbine bearing complete with thrust collar and pedestal.
- 1 - draft tube cone, bend and diffuser

1 - Governing System comprising:-

- 1 - Governor actuator
 - The governing pumps
 - The sump tank.
- 1 - butterfly valve.

NOTE: The connecting pipe between the inlet valve and the spiral casing is not included. However the necessary drawings has to be supplied by the contractor free of charge.

Tools and instruments for Acceptance Tests at site:-

The necessary equipment for the tests shall include:-

- 7 - current meters
- 1 - recorder with 24 pens
- 1 - weight manometer for head measurement.
- Miscellaneous materials including small piping and wiring, fittings, valves, etc.
- Consumable goods.

In addition to the major items listed above, the necessary pipings for oil, grease, compressed air and water shall also be supplied by the contractor. Compressed air pipings relevant only to governing system and dewatering system shall also form part of the supply. The supply of pipes for water circuits shall include ~~for~~ those relating to the draining equipment and the cooling water system for the turbine bearing and governing system.

The contractor shall also furnish the following items:-

- a) i) All limit switches indicating the position of the oil in the pressure receiver and the main oil sump; limit switches for the inlet valve and overspeed protection device.
- ii) Indicating instruments such as oil pressure indications, speed indicators, water pressure indicators and compressed air pressure indicators.
- iii) Necessary visual alarms.

- b) The necessary pressure gauges for the oil pressure, water pressure and the compressed air.
- c) Starters and protective gears for all motors.
- d) Permanent magnet generator for pendulum motor.
- e) Grease gun for the lubrication of the wicket gates.
- f) Duplicate strainers for the guide bearing lubricating oil and the governor oil
- g) Guard for the lower part of the coupling flange.
- h) Slings for handling the rotating parts of the turbine.
- i) Dual Selsyn indicators for ^{indication of} load limiting, speed level adjustment, speed drop etc. and Controls for load limiting, speed level adjustment etc.
- j) Thrust Bearing and Guide bearing with thermostats for the indications of the temperature.
- k) Coupling bolts for coupling the ~~turbin~~ turbine and Generator.

==o==o==o==

APPENDIX II

1. Schedule of prices for the equipment, tools and
spare parts to be supplied under the
contract.

Item No.	Description	Quantity	Prices F.O.B. Marseilles in £ sterling.
1	2	3	4
1 a)	10,150 BHP, 214 RPM, Vertical Kaplan turbine with scroll case etc. complete	One	68,600
b)	Main inlet valve with by-pass valve etc. for connecting 30 ft. dia. penstock with the turbine casing.	One	10,850
2 a)	2,800 BHP, 500RPM, Horizontal Francis turbine with scroll case etc. complete with Bronze Runner (£.350 extra vide letter No. T 529/4570 of 11-11-57) including Thrust Bearing.	One	15,850
b)	Main inlet valve with by-pass valve etc. complete for connecting 6 ft. dia. penstock to the turbine casing	One	5,300
3 a)	17,000 BHP, 250 RPM, Vertical Kaplan turbine with scroll case etc. complete.	Two	1,41,550
b)	Main inlet valve with by-pass valve etc. for connecting 10 ft. dia. penstock with the turbine casing	Two	30,400
4	Automatic control of Right Bank Station turbines from the river bed station Control Board.	One	Included in item 3(a)
5.	Flow metering equipment and accessories	Four sets	780
6.	Compressed air plant for governing installation and depressing water level when operating as a synchronous condenser	One	3,410
	1) Right Bank Station		
	11) River Bed Station	One	3,410
7.	Tools and Tackles for erection and maintenance including test ring and cover:		
	1) River Bed Station	Lot	2,500
	11) Right Bank Station	Lot	River Bed Station tools will be 440 used.
	111) Left Bank Station	Lot	
8.	Extra tools and instruments required for acceptance tests at site.	Lot	2,300
9.	Drainage and dewatering pumps for River Bed Station only.	One set	530

10)

PRICE SCHEDULE OF SPARE PARTS.

Sl. No.	SPARE PARTS	OB Marseilles prive (C. Stg)		
		Right Bank Station	Left Bank Station	River Bed Station

TURBINE

10.A	a) One complete runner blade	900	-	1,100
	b) One complete set of blade sealing device	75	-	105
	c) Two wicket gates complete with levers and keys	320	100	370
	d) One set of breaking links	64	40	70

GOVERNOR

B.	a) One pendulam, with driving motor for the Right Bank & River Bed units only and a belt driver pendulam for left bank unit.	74	40	74
	b) One set of all springs used in Governor actuator	5	4	5
	c) One pilot valve	14		14
	d) One distribution valve	500	40	500
	e) One shut-down solenoid	12	12	12
	f) One set of all packings	13	10	13

MAIN VALVE

C.	a) One set of seals for the main valve	43	26	43
	b) One operating Solenoid	12	12	12

NOTE:- All the prices given above include for packing for ocean shipment and are Firm throughout the period of contract.

LIMITS OF CONTRACTOR'S SUPPLY

The following items will not form part of the contractors supply:-

- Penstock extension upstream of the main inlet valve. The downstream flange of the penstock shall be finished by the Purchaser as per Contractor's drawings
- Connection pipe between main inlet valve and spiral casing. However the necessary drawings for its drawings shall be furnished.
- Stop logs to be placed at the exit of the draft tube and their guides.
- Hand rails, stair cases and chequered plates other than that required in the turbine pit or governor cabinet and covers for taking off oil pipings, hatchways required for removal of parts being supplied by the turbine manufacturer.
- Metallic structures for supporting the Generator and Generator bearings.
- All Wires and Cables external to the Governor Cabinets. The Governor Cabinets on which the Contractor's items are situated shall be wired before despatch and shall be provided with terminal boxes for connecting the wires and supply cables included in other suppliers.
- All Electric relays
- Switchboard in the power station control room and its appliances.
- Equipment feeding clean cooling water under adequate pressure to cooling circuits.
- Foundation works which shall be made by the Purchaser according to the contractor's drawings. Reinforcement drawings are not included in the Contractor's supply.
- Traveiling Cranes and their accessories. The Contractor shall however supply a set of slings for lifting the turbine rotating parts.
- Final painting of the machines after completion of erection. However the Contractor's equipment shall be shipped to site with corrosion resisting paint. The embedded parts shall be covered with a special paint.
- Erection Tools. The contractor shall however supply all non-standard tools for erecting and dismantling of the equipment. The Contractor shall also supply two sets of spanners mounted on boards.
- Oil and grease for first filling of Governor and also handling and Filtering equipment for oil.
- All materials such as light, water, Electricity, Compressed air, light machining facilities, welding sets, pressure test pump and consumable goods like grease, oil, cotton waste etc, and services of skilled and non skilled Indian personnels in connection with the erection of the equipment.

All the prices given above include sea-worthy packing wherever required. The F.O.B. prices are firm and not subject to any variations, and are in transferable £.sterling.

Should the ^{Contractor}(purchaser) so desire, the Contractor shall arrange for the shipment of the machinery ~~for~~ F.O.B. European Port to C.I.F. Madras on behalf of and on account of the Purchaser, in which case the expenses involved shall be invoiced to the ^{Contractor}(Purchaser) according to actual expenses.

The ^{Contractor}(Purchaser) shall provide for all incidental and statutory charges, such as customs duty, clearance, loading and unloading, railway freight and transport upto site, octroi, sales and terminal taxes which will be applicable at the time of supply.

2. Charges payable to the contractor for the services of Foreign Personnel for supervision of erection, tests and maintenance at site:

<u>Item No.</u>	<u>Details of personnel</u>	<u>Rate per</u> <u>Calendar day</u>
1	Specialist or Maintenance Engineer ...	£.10 + Rs.25
2	Erection Supervisor ...	£.10 + Rs.25
3	Erector ...	£. 6 + Rs.25

These daily rates are applicable per calendar day from the date of leaving home upto date of return to France. They are based on a - maximum working time of 8 hours a day, limited to 44 hours a week. For each working hour over 44 hours a week, the following extra charges are applicable.

1) Specialist or Maintenance Engineer	...	£.2-10- 0
11) Erection Supervisor	...	2-10- 0
111) Erector	...	1-10- 0

These extra charges are subject to increase by 6 sh. for the Specialist Engineer and Erection Supervisor and by 3 sh. for the Erector in case they work on Sundays, Bank holidays or for night work after 10 p.m.

Actual travelling expenses by air, rail and road from Grenoble to site and return for the personnel and their luggage shall be chargeable to the Purchaser. (The purchaser) will provide free of charge suitable lodging quarters at site, furnished with necessary accommodation, water, electricity, lighting, fans etc., free transport to and from site if the lodging accommodation is more than a mile from site, and free medical assistance to the personnel. The (Purchaser) shall also make payment of all taxes due in India for all foreign personnel employed by the Contractor for the purpose of carrying out the supervision of erection.

The above enumerated rates and terms are based on the official labour index (B.O.S.P.) existing in France on March 1st, 1957, and they will be adjusted at the time when starting the erection, if necessary, according to the following formula:

$$R' = R \frac{S'}{S}$$

in which

R = daily rates stated above

R' = re-adjusted rates

S = salary index on the 1st of March, 1957

S' = Salary index at the time of starting the erection.

The (purchaser) shall provide free of charge skilled and unskilled Indian personnel.

3. Schedule of delivery of the plant F.O.B. European Port:

	<u>Embedded parts</u>	<u>Balance</u>
Items 1(b) & 1(b) - (Turbine for the Right Bank Station and Main inlet valve)	22 months	24 months
Items 2(a) & 2(b) - (Turbine for the Left Bank Station and Main inlet valve)	18 months	
Items 3(a) & 3(b) - (Two Turbines for the River Bed Station and two main Inlet valves)	18/20 months	20/22 months
Item 4 upto and including item 10 (Accessories and Spares)	Together with the respective turbines.	

The above mentioned delivery periods shall be ^{reckoned} valid from 17th July 1958. These delivery periods shall be valid, provided that the drawings submitted by the Contractor for approval ^{will be approved} are provided (or otherwise) within 30 days ~~of receipt~~ are fixed on the basis that the drawings submitted by the Contractor for approval of the Government will be returned to the contractor within 30 days of the receipt of the said drawings. Should there be any delay in returning the drawings, the **PENALTY FOR LATE DELIVERY** delivery periods shall be extended by the actual period of delay beyond 30 days, in returning the drawings.

The penalty for delivery of the materials later than the periods indicated above or such extension which may be mutually agreed upon shall be at the rate of 2% of F.O.B. price of that part of the equipment that is delayed subject to a maximum penalty of 10% of total F.O.B. price of such machine or machines delayed excluding spares. The above penalty shall not however apply if the delay is due to causes beyond the control of NEYRPIC (Force majeure) and in any case where it does not cause any loss to the purchaser.

TERMS OF PAYMENT

Subject to any deductions, which the purchaser may be authorised to make under the contract, or subject to any additions or deductions provided for elsewhere under this contract shall be entitled to payment as follows indicated in the Bank Guarantee form annexed hereto.

a) 30% of the F.O.B. prices of the order to be paid pro-rata of the F.O.B. value, against presentation of the respective shipping documents.

TERMS OF PAYMENT FOR SUPERVISION OF ERECTION:-

The monthly charges for supervision of erection will be paid to the contractor against bills submitted monthly by the contractor.

IMPORT LICENCE:

Import Licence No. 016343-CGI-BEP dated 15th May 1958 has been granted by C.C.I. for importing the Turbines. The receipt of Import Licence has been intimated to the contractor in the ^{Ministry's} Purchaser's office letter No. 3-10-3-4399-900 dated 17th July 1958 and the delivery period shall be reckoned from the date.

6.60 GUARANTEED PERFORMANCE PARTICULARS.

Sl. No.	Particulars.	Right Bank Unit.	Left Bank Unit.	River Bed Unit.
1.	Gross head.	Max. 71 Rated 60 Min. 19	144 115 79	164 140 99
2.	Net head.	Max. 69.5 Rated 58.5 Min. 18.5	145 144 73.5	162 157.5 97.5
3.	Corresponding minimum FVL.	+107.5	+33.0	+22.0
4.	Cavitation limit output.	As per Drawing H-2H-1(a)	As per Drawing H34048	As per Drawing H 3978
5.	Full load output	Max. 10150+153 Rated 10150 Min. 1500	2500+153 2200 1420	17000+153 17000+153 17000
Notes:- (Full load outputs under maximum and minimum, not guaranteed but full load output under rated head is guaranteed)				
6.	Guaranteed efficiency (per cent) at rated head and at			
	1) 100% full load output	87.5	88.8	90.8
	11) 75% -do-	91.5	89.0	91.6
	111) 50% -do-	93.9	82.5	88.5
7.	Normal speed.	214	500	250
8.	Runaway speed-a) Practical	580	1000	610
	b) Theoretical	610	1000	630
9.	Minimum factor of safety.	2/3 elastic limit		
10.	Maximum unbalanced hydraulic thrust (tons)	125	10	235
11.	Sensitivity of the Governor.	4/10,000	10/10,000	4/10,000

Notes:- The outputs and efficiencies of the turbines for outputs at heads other than the rated head are not guaranteed.

	Head in ft.	Output in BHP.	Efficiency.
a) Right Bank Station.	71	11,650	84.5
b) Left Bank Station.	120	2,970	85.5
	130	3,200	87.53
	140	3,200	87.3
	144	3,200	86.53
c) River Bed Station.	210	18,200	86.03
	120	19,200	86.03
	130	19,500	88.13
	140	19,500	89.53
	150	19,500	90.13
	160	19,500	90.43
	164	19,500	90.53

7.00 - GENERAL DATA.
(This data is for information only)

Sl. No.	Particulars.	Right Bank Unit.	Left Bank Unit..	River Bed Unit.
1. <u>RUNNER.</u>				
a) Material				
1) Hub.	Cast steel	Prolongation of hub of steel plate.	Cast Steel	
11) Blades.	Stainless steel	Runner of bronze	Stainless steel	
b) Diameter of the runner	2700 m.m.	1000 m.m.	2700 m.m.	
c) Number of blades	5	15 vanes.	7	
d) Range of blade movement.	30°	-	25°	
2. <u>TURBINE SHAFT.</u>				
a) Materials	Forged Steel	Forged Steel	Forged Steel.	
b) Diameter	470 mm.	240 mm.	500 mm.	
3. <u>SPIRAL CASING.</u>				
a) Material & construction	Welded steel plate	C.I. welded steel plate or cast steel	Welded steel plate	
b) Entrance diameter of casing.	3550 mm.	1100 mm.	3300 mm.	
c) Range of plate thickness	3/8 - 7/16"	-	3/8 - 1/2"	
4. <u>STAY RING.</u>				
a) Material & construction	Welded steel plate	C.I. or cast steel.	Welded steel plate	
b) Number of stay vanes	12	8	12	
5. <u>WICKET GATES & OPERATING MECHANISM.</u>				
a) Material of wicket gate.	Cast steel	Cast steel	Cast steel	
b) Number of wicket gates	24	16	24	
6. <u>DISCHARGE RING.</u>				
a) Material & construction.	Stainless steel	Cast steel or welded steel plate.	Stainless steel	
b) Thickness.	7/8" - 1"	-	7/8" - 1"	
7. <u>DRAFT TUBE LINER.</u>				
a) Material & construction	Welded steel plate	Welded steel plate	Welded steel plate.	
b) Thickness	3/8" - 7/16"	-	3/8" - 7/16"	

8. WICKET GATE SERVO MOTORS.

a) Capacity	64000 lb.ft.	-	163500 lb.ft.
b) Number of servo motors	2	1	2
c) Volume	32 litres	-	90 litres

9. RUNNER BLADE SERVO MOTOR.

a) Capacity	94,500 lb.ft.	-	240,700 lb.ft.
b) Volume	52 litres	-	136 litres
c) Location	Runner hub	-	Runner hub

10. VELOCITY AT RATED HEAD AND RATED HP.

a) at inlet to spiral casing	15.7 ft/sec.	23.8 ft/sec	19.1 ft/sec.
b) at runner discharge	34.5 ft/sec.	29 ft/sec	41 ft/sec.
c) at exit of draft tube.	6.7 ft/sec.	9 ft/sec	6.2 ft/sec.

11. a) Weight of turbine rotating parts including oil	20 tons	3 tons	30 tons
b) WR^2 of the rotating parts lb. ft ² .	90,000	-	1,20,000

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12. SPEED & PRESSURE REGULATIONS.

a) Guaranteed rated output.	10,150 BHP	2,800 BHP	17,000 BHP
b) Discharge for above output	1,680 cusecs	245 cusecs	1,770 cusecs
c) Governor time (secs)			
i) Normal closing	3.0	-	3.5
ii) Normal opening	6 to 7	-	6 to 7
d) Sudden full load rejection			
1) Maximum instantaneous pressure rise (% of net head)	30%	30%	30%
ii) Maximum instantaneous speed rise (%)	45%	45%	45%

13. OIL PRESSURE SYSTEM.

a) Type and capacity of oil pumps.	Gear pumps i) Main pump 4 lit/sec. ii) Aux. pump 2 to 2.5 lit/sec.	-	Gear pumps i) Main pump 5 lit/sec. ii) Aux. pump 2.5 lit/sec.
b) Capacity of the pressure tank	550 gal.	Not necessary.	790 gal.
c) Number of complete operations which can be performed by oil in pressure tank when pumps are not working.	3 successive single stroke operations of which wicket gate servo motor plus corresponding movement of runner of servo motor plus one stroke of main valve servo motor.		

14. COMPRESSED AIR SYSTEM.

a) Type	Spires	Not necessary spires.
b) Capacity.	370 cu.ft/hr.	370 cu.ft/hr.
c) Air pressure.	425 p.s.i.	425 p.s.i.
d) Capacity of air receiver	-	
e) Speed and rating of motor	6 HP	

8.00 - DESCRIPTION OF THE EQUIPMENT:

8.01 - Turbine:- The turbine offered for Right Bank and River Bed Stations shall be suitable for operation with the thrust bearing resting upon the lower bracket of the generator. The bearing arrangement for the Left Bank unit shall be decided in consultation with the Generator manufacturer.

Turbine Rating and Rotational Speed:- The turbine for the Right Bank Station shall be a 214 RPM, vertical Kaplan type machine. The turbine for the left bank station shall be of the horizontal Francis type with a speed of 500 RPM. The two turbines for the River Bed Station shall be of the vertical Kaplan type with a speed of 250 RPM. The ~~Right and Left~~ River bed ~~Bank~~ turbines shall be capable of delivering output to the extent of the rated output of 17,000 BHP even at the minimum gross head of 99 feet and 15% extra output at heads higher than 99 feet depending on the available head.

Runner and Runner Blade Control Apparatus:- The runner shall consist of a cast steel hub with adjustable blades mounted on the periphery. The runner blades shall be cast in stainless steel. The entire runner assembly shall be balanced statically at the contractor's works and be capable of being removed through the stator bore.

The servo-motors for adjusting the tilt of the runner blades shall be lodged above the runner hub.

Shaft:- The shaft shall be made of open-hearth carbon steel properly heat treated with integrally forged flanges for connection at one end to the turbine runner and at the other end to the generator's shaft.

If it is found on final collaboration with the generator manufacturer that the shaft length will have to be increased over and above that indicated in the tender, the extra cost of shaft for coupling the two shafts shall be equally borne by the turbine and generator manufacturers.

21)

Speed Rings:- The speed ring shall be composed of stay vanes made of cast steel plates, built in two elements to facilitate handling. Necessary flanges and bolts shall be provided to erect the two elements at site.

Spiral Casings:- The spiral casing shall be of steel plate construction with successive steel plates welded to the speed ring and to each other. The entire speed ring shall be drilled and matchmarked at the manufacturer's works.

Head Cover:- The head cover shall be of welded steel plate construction and shall provide the necessary support for the guide bearing. Also they shall be provided with bronze bushes for the guide vane stems.

Discharge Ring:- This ring shall be of stainless steel construction and shall be provided with flanges for bolting it to the bottom ring.

Guide Apparatus:- ~~This ring is~~ The guide apparatus shall comprise of:

One - Set of guide vanes cast integrally with their trunnions.

One - Gate operating ring of welded steel plate.

Two - Servo-motors to operate the guide vanes under the Governing system.

The necessary connecting rods shall also be provided for servo-motors operation.

Draft Tube:- The draft tube shall have a profile so that excavation is a minimum and efficiencies obtained high. The draft tube cone shall be lined with steel plate upto a section where the diameter is 1.4 times the diameter of the exit cone.

Pressure Oil Governing System:- The essential items for the governing system shall be provided.

The Governor Actuator of Tachometric type to consist of actuator head, gate limiting device, speed adjusting device, speed droop adjustment, automatic shut-down, speed indicators and restoring connections.

The Permanent Magnet Generator: Self excited to supply the pendulum motor shall be of the friction driven type.

22)

The Pressure Oil Pumping System:- Comprising of pumping sets, pressure tank, sump tank and the compressed air equipment.

The Governing Panel:- The governor and its auxiliary components shall be housed in a fully enclosed sheet steel panel of neat appearance.

The necessary controls, gauges, relays should be mounted on the governor panel to centralise the controls. Dual Solayn indicators for indication for load limiting device and speed level adjustment, speed drop, etc., shall also be included.

8.02 - The Main Inlet Valve:- The valve body shall be of fabricated steel plate and one end shall be bolted to the downstream end of penstock flange.

The valve ^{disc} ~~body~~ shall be either of cast steel construction or of welded steel plate.

The by-pass valve and its piping shall have a diameter sufficient to admit the correct discharge for the priming operations.

The valve shall be complete with dismantling joint and all other accessories necessary for satisfactory operation and maintenance.

The Operating Mechanism:- The inlet valve shall be operated by an oil operated servo-motor and a counterweight. The oil under pressure shall be supplied by the governing system of the main turbine.

8.03 - Miscellaneous Items:- The necessary dewatering equipment with the pressure tanks, compressed air system, hydrosjector and piping shall also be supplied.

The supply shall include for all special tools and chequer-plating round the turbine pit, governor cabinet, etc.

8.04 - Materials, Workmanship and Manufacture:- All the equipment shall be manufactured with new and first quality materials and according to the most recent standards and practice. All the materials used will be in accordance with the French official standards of AFNOR (Association Française De Normalisation). The motors and Electrical appliances shall be in accordance

with the French U.S.E. standards (Union des Syndicate de l'Electricite') special type with moisture resisting insulation and suitable for operation under 400 volts, 50 cycles, 3 phase, A.C. Power supply and 110 volts D.C. Power supply

9.00 - G U A R A N T E E S:

The contractor shall be responsible for replacing at site and free of cost any parts of plant and equipment that may prove faulty or fail by reason of any of causes (a), (b), (c) or (d) stated below within one year ~~and~~ after the plant has been put into operation by the Government of Mysore or 30 months after the shipment, whichever is earlier.

- a) Quality and strength of materials used.
- b) Adequate factor of safety for all parts of the equipment to withstand the mechanical and/or electrical stresses developed therein.
- c) Suitability of design and workmanship of the plant for the conditions envisaged in these specifications.
- d) The efficiencies, temperature rises and other performance data furnished for the plant and the schedule of performance, etc., indicated in the ~~xxx~~ annexures as far as they are guaranteed.

10.00 - N O N F U L F I L M E N T O F G U A R A N T E E S:

10.01 Should the operation of any piece of apparatus show that it does not meet with the guarantees and/or requirements, the ^{purchaser} (purchaser) reserves the option to accept or reject the apparatus and to direct the contractor to at once proceed to furnish such new parts as may be necessary to make the apparatus meet the guarantees and other requirements. All expenses for furnishing and of installing new parts or alterations to existing plants shall be borne by the contractor.

10.02: Guarantees for output and efficiency:- The outputs of the turbines at full gate opening, when operating at the rated net heads and their efficiencies at the above heads and when delivering 50%, 75% and 100% outputs shall be guaranteed under penalty indicated below, with a measurement tolerance of 1% and a rejection limit of 4%. For purposes of comparison, arithmetical mean of the measured efficiencies at 100%, 75% and 50% outputs

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shall be compared with the arithmetical mean of the guaranteed values. The penalty levied shall be as indicated below for each per cent difference between the measured and guaranteed efficiencies. However, the total penalty for turbine equipment excluding spare, shall be to be limited to 10% of the F.O.B. price of each equipment.

River Bed Station Turbines	Rs. 55,000/-
Right Bank Station Turbine	45,000/-
Left Bank Station Turbine	10,000/-

10.03: Cavitation Guarantee:- The loss of material due to cavitation shall not be more than the figures derived from the following formulae. The duration of the guarantee shall be either 8,000 hours of operation or 12 months whichever is shorter.

Loss of material in the runner in pounds	$0.8D^2$	) For Kaplan turbines.
Loss of material in the discharge ring in pounds.	$0.4D^2$	

Where D = Diameter of runner in feet.

During the period of the guarantees the operation of the turbine at overloads and partial loads less than 30% of the rated output would be restricted to 800 hours only.

Should the runner and /or discharge ring suffer from excessive pitting due to cavitation, as defined above, the contractor shall undertake at his own cost to repair the pitted portions of the runner and discharge ring by stainless steel welding followed by grinding to a smooth surface and shall agree to extend the same guarantee in this respect for the periods as indicated in para 1 above from the date the unit is so repaired and put into regular service. If within the guaranteed period, inspection reveals that cavitation guarantee is not sustained, the contractor shall supply a full set of new runner blades and/or discharge ring free of charge delivered at site.

11.00 - COLLABORATION WITH GENERATOR MANUFACTURER:

The contractor shall fully collaborate with the generator manufacturer in all respects to ensure satisfactory erection and operation of the machines and no extra charge will be paid to the contractor by the ^{Government} purchaser for the same.

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12.00 - A R B I T R A T I O N:

In case of any dispute, the Indian Arbitration clause will come into force.

13.00 - TRAINING OF DEPARTMENTAL ENGINEERS:

The contractor shall provide necessary facilities for the training of two Engineers deputed by the Government of Mysore in the manufacture, design, assembly and testing of the equipment. The contractor shall provide for these Engineers free of charge meals at the mess of the contractor plus a monthly allowance of 50,000 French Francs each, the lodging however shall be to the Engineers' account.

The training period shall be limited to six months.

14.00 - P A C K I N G:

All parts shall be securely boxed, crated and protected against mechanical damage as well as corrosion by sea-water.

All packing dimensions shall not exceed the following limitations:-

- 1) Maximum dimensions of a crate that can be loaded on metre-gauge of Indian Railway, as indicated in purchaser's specification drawings.
- 11) ^{Dimension} ~~Maximum~~ load of ~~metre~~-metre-gauge wagon as per Drawings No. TEM-108 and SVHEP-150.

The maximum weight of the heaviest crate shall be 34 tons.

15.00 - INSURANCE

The contractor shall be responsible for the insurance of the equipment from manufacturer's works until delivery of the equipment F.O.B. Port of shipment. He shall contact the Trade Agent for Mysore in London, well in advance of the shipment of the equipment for further insurance of the equipment upto the destination (LAKKAVALLI). He will arrange for the necessary insurance.

16.00 - SHIPPING

The contractor shall contact the Trade Agent of the Government of Mysore in London well in advance of shipment regarding shipment of the

equipment and he will arrange for the same.

17.00 - SECURITY DEPOSIT

A security deposit of 5% of the value of the order in cash or in the shape of a Bank Guarantee from a Scheduled Bank acceptable to the purchaser shall be provided by the contractor. The security deposit shall be released after expiry of the guarantee period indicated in clause 9.00. The Security deposit furnished by the contractor or any portion thereof will be forfeited at the absolute discretion of the purchaser in the event of non-fulfilment of any of the terms of this contract.

18.00 - CONSIGNEE & SHIPPING MARKS:

The consignee shall be "The Superintendent, Bhadra Reservoir Hydro-Electric Project, Lakkavalli, Via Birur." The letters "COMED - LAKKAVALLI", the Foreign Indent and the Foreign Order numbers and the usual identification mark of the Government of Mysore as shown below shall be clearly marked on all the packages.

F.O. No. 2008

F.I.No.

19.00 - ELECTRIC MOTORS & MOTOR CONTROL GEAR:

All motors shall be directly connected to the apparatus driven and shall be suitable for operation on either (i) 415 Volts, 3-Phase, 50 cycles, A.C., (ii) 240 Volts, single-phase, 50 cycles, A.C., or (iii) 110 Volts, D.C. supply as required.

20.00 - GALVANISING:

All galvanising shall be done after fabrication by the hot-dip method. Threads and bolts shall be so made that after galvanising the nut will have a neat fit and that they can be turned through the length of the threads of the bolt and that they will be capable of developing the full strength of the bolts.

27)

21.00 - TROPICAL TREATMENT:

The equipment will be subject to operation under an ambient temperature of 45°C for air and 80°C for water and very high relative humidity. All the equipment shall therefore be designed and treated for normal life, and satisfactory operation under the hot and humid climatic conditions prevalent at the site and shall be dust and vermin proof. The equipment shall be given a special treatment for tropical conditions.

22.00 - MARKINGS OF PARTS:

To facilitate identification at destination and erection, the several parts of the plant and equipment shall be suitably tagged before shipment with cross reference to the relevant assembly drawings.

23.00 - DRAWINGS:

Three sets of drawings certified for construction work at site including detailed foundation drawings shall be despatched by the contractor within three months after order is placed and all details supplied. Three further sets of prints and one set of tracings on cloth or velograph shall be supplied at the time of shipment. One additional cloth bound copy certified as contract drawing shall also be supplied.

Schematic diagrams of all piping systems, control, instrumentation, protection and alarm system and wiring diagram for all electrical circuits shall also be furnished.

Foundation drawings of all component parts of the plant showing the details of the foundation required for these parts and of all ducts, trenches, etc., required for pipes, cables and other accessories. The drawing shall contain all the information required by the ^{contractor}(purchaser) for designing of civil works.

Separate drawings of all important components parts of the plant showing the details, mode of fastening, etc., shall also be provided.

Three prints with dark lines on a white background shall be furnished of each drawing submitted for approval. One copy will be returned to the contractor marked "Approved", "Approved with corrections indicated" or "Examined and Returned for correction". Upon receipt of prints which have been "Approved", the contractor shall furnish without delay six (6) additional prints of each drawing with dark lines on a white background.

If minor revisions are made after a drawing has been approved, the contractor shall furnish six (6) additional prints subsequent to each revision. No major revision affecting the design shall be made after a drawing has been "Approved" without representing the drawing for formal approval.

The purchaser shall have the right to require the contractor to make any changes in the design which in his opinion is necessary to fulfil the specification requirements without any extra cost to the (purchaser.)

24.00 - INSTRUCTION & SPARE PART BOOKS:

The contractor shall supply (six copies) free of cost upon completion of the work.

- a) Full instructions for the operation and maintenance of all parts.

25.00 - T E S T S:

Test to be made before shipment:- The following tests shall be conducted by the contractor before shipment of the equipment.

- a) All pipes, valves, fittings, governor, pressure tanks and other components of the governing system shall be tested under a pressure maintained at 150% of maximum working pressure for not less than half an hour and the equipment shall withstand the pressure without showing any sign of leakage, damage or failure.
- b) Complete governor shall be assembled at the manufacturer's works and tested to ensure correct operation, and all motors, pumps and other auxiliary equipment shall be tested in accordance with the relative approved standards.
- c) Main valve shall be assembled and tested:-
 - 1) At a pressure 75% over and above static head for 30 minutes.
 - 11) For satisfactory operation over the entire range of closing and opening as specified.

- d) Any other tests and inspections on the equipment covered by the contract the purchaser may consider necessary to satisfy themselves that they comply with the specification in performance, workmanship, design and quality of material.

No shipment of any portion of the equipment shall be made till the test certificates conducted at the factory are approved by the (purchaser) or his representative. One advance copy of the test certificates shall be sent for approval of the (purchaser) by Air Mail.

Six additional copies be furnished in due course. The (purchaser) reserves the right to check the test results by repeating any or all of the above tests after the turbines have been received and installed at site. They also reserve the right to test the other characteristics of turbine, governors and other equipment in order to verify the guarantee, performance details such as speed regulations, pressure variation, etc., as stipulated in the specifications.

Tests at site:- To verify whether the guarantee regarding output and efficiency are within specified limits after the turbines are erected at site, tests shall be conducted at site. Any other tests other than the acceptance tests such as turbine regulation test, speed rise test, runaway speed test, etc., shall be conducted by the (purchaser) if necessary.

For checking the guarantees, the test shall be carried out in accordance with the latest A.S.M.F. Test Code. The outputs however to be guaranteed with a measurement tolerance of 1% and a rejection limit of 4%. For the measurement of efficiency the pressure tapping for the measurement of head shall be at the entry to the spiral casing as stated in Contractor's letter No. T 529/1616 dated 7th May 1958.

SCHEDULE OF DEVIATIONS FROM THE SPECIFICATIONS.

Cl. Clause & No. Para No.	Deviation by the tenderor.	Justification by the tenderor.
1. 2.05.06	<u>Draft tube lining:</u> The upper part of the draft tube near the discharge from the runner shall be lined with stainless steel in order to minimize the effect of cavitation.	The discharge ring in fact incorporates the upper part of the draft tube as can be seen on drawing 193.302 and it is made of stainless steel. It is therefore needless to provide any part of the draft tube lining in stainless steel.
2. 2.05.07	<u>Guide wheel cover:-</u> This shall be of cast steel with removable protecting rings of wrought iron or cast steel.	The guide wheel cover or the top cover shall be of welded steel plate construction for all the Kaplan turbines. The cast steel cover offers no advantage and leads to lengthy deliveries of the equipment since the manufacturer is bound by the foundry deliveries. As regards labyrinth seals, they shall be provided in part of the carbon seal as seen on drawing 193.302. Facing plates at the top and bottom covers are not essential for Kaplan turbines since they operate under low heads.
3. 2.05.09	<u>Cavitation Guarantee and penalty.</u>	Instead of calculating the cavitation guarantee on the basis of the values in 2.05.09 of the following criteria is preferred. The loss of material shall not be more than the figures derived from the following formula. The duration of the guarantee would be either 6000 hours or 12 months whichever be the shorter. Loss of material $\frac{1}{2}$ in the runner in $\frac{1}{2}$ 6.0 D² pounds. $\frac{1}{2}$ Loss of material $\frac{1}{2}$ in the discharge $\frac{1}{2}$ 0.4 D² ring in pounds. $\frac{1}{2}$ where D = Diameter of the runner in feet. This formula is valid for Kaplan turbines only.

During the period of the guarantee the operation of the turbine at over load and partial loads less than 30% of the rated output would be restricted to 800 hours only.

4. 2.03.11 Guide Apparatus:-
The movable guide vanes shall be of stainless steel and the spindle and Vane shall be cast in one piece and be easily accessible for replacement.

It is not considered necessary to provide the guide vanes of stainless steel. This provision would be justified for a medium head of high head Francis turbine but with a Kaplan turbine which operates under low heads ordinary cast steel guide Vane would quite satisfy the requirement. The extra price for stainless steel guide vane has been given in the quotation.

5. 2.03.14 Stand by oil pump set
(9) for the entire power station.

Supplying of a stand by set for each unit instead of one unit for the entire power station is preferred.

6. 2.03.15 J h o f t.

Normally the turbine shaft is not built to the generator manufacturer for effecting the alignment. The alignment shall be done by means of a drilling template which can be sent by the turbine manufacturer to the generator manufacturer or vice versa.

7. 2.03.19 The complete rotating element shall be tested for 5 minutes at the generator manufacturer's works before shipment

It is not necessary to do the tests on the thrust bearing at the manufacturer's works. The thrust bearing shall be correctly machined and surfaced and the final runaway speed tests if required shall be done at site.

8. 2.02.07 Runaway Speed:-
The turbine shall be tested by the manufacturer by actually running it for 5 minutes at the manufacturer's works.

It is not possible to erect a Kaplan turbine completely at the manufacturer's works. However, subjecting the turbine to runaway speed tests after the erection of the turbine at site is acceptable.

Output and Efficiency

Unit.	Percentage full load output.	Output at gross head of - ft -						Efficiency at gross head of - ft -					
		71	60	50	40	30	19	71	60	50	40	30	19
10.150	100	10150	10150	8150	6100	4100	1500	89,5	87,5	88,0	87,0	84,5	77,0
	90	9130	9130	7340	5470	3690	1350	91,0	89,5	89,6	88,0	85,0	76,4
	80	8120	8120	6520	4830	3250	1200	91,6	91,0	90,5	89,2	85,1	74,8
	70	7100	7100	5710	4270	2870	1050	91,6	91,6	90,6	89,3	85,0	73,0
	60	6030	6030	4990	3660	2450	900	91,3	91,5	90,3	89,2	84,8	71,0
	50	5080	5030	4070	3050	2050	750	90,5	90,8	89,9	88,6	84,2	67,4

- Notes:- a) The outputs and efficiencies are not guaranteed for percentage gate openings but as fractions of load at any given head.
- b) The efficiencies under outputs lower than 5/10 full load for any head are not guaranteed.
- c) Efficiencies and outputs for all heads excepting the rated head are purely indicative and are not guaranteed.
- d) The turbine shall be capable of delivering outputs to the extent of 15% over and above the rated output at the maximum head and proportionately high outputs at heads between maximum and rated head.
- e) The efficiencies indicated under the gross head of 71 ft. head refers to the outputs without the 15% extra capacity.

Unit.	Percentage full load output.	Output at a gross head of - ft -								Efficiency at a gross head of - ft -							
		164	160	150	140	130	120	110	99	164	160	150	140	130	120	110	99
17000	at overload																
B 3 2	max. 15	13500	12500	10500	10500	10500	10000	10000	-	90,5	90,4	90,1	89,3	88,1	86,0	86,8	-
	Full load output 100	17000	17000	17000	17000	17000	17000	17000	17000	91,2	91,6	91,5	90,3	90,4	89,6	88,2	86,5
	+15.																
	90	15500	15300	15300	15300	15300	15300	15300	15300	91,0	91,4	91,7	91,6	91,3	90,6	89,8	88,2
	+15.																
	80	13600	13600	13600	13600	13600	13600	13600	13600	90,5	90,5	91,5	91,7	91,6	91,4	90,6	89,4
	+15.																
	70	11900	11900	11900	11900	11900	11900	11900	11900	89,2	89,7	90,5	91,3	91,6	91,5	91,1	90,2
	+15.																
	60	10200	10200	10200	10200	10200	10200	10200	10200	87,3	88,3	89,2	90,2	90,8	91,2	91,1	90,2
	+15.																
	50	8500	8500	8500	8500	8500	8500	8500	8500	84,1	87,0	87,9	88,5	89,6	90,2	90,2	89,3

- Notes:- a) The outputs and efficiencies are not guaranteed for percentage gate openings but as fractions of load at any given head.
- b) The efficiencies under outputs lower than 5/10 full load for any head, are not guaranteed.
- c) Efficiencies and outputs for all heads excepting the rated head are purely indicative and are not guaranteed.
- d) The Turbine shall be capable of delivering outputs to the extent of 15% over and above the rated output at the maximum head and proportionately higher outputs between maximum and rated head.
- e) The efficiencies indicated under the gross heads of 164, 160 and 150, refer to the outputs without the 15% extra capacity.

Unit	Percentage full load output	Output at gross head of - ft.								Efficiency at gross head of - ft.									
		144	140	130	120	115	110	100	90	79	144	140	130	120	115	110	100	90	70
2.800 B.H.P	at overload max. 15%	3200	3200	3200	2970	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Full load output 100	2800	2800	2800	2800	2800	2620	2260	1900	1420	87,2	88,1	89,8	89,8	88,8	89	89	87,5	81
	+15%																		
	90	2520	2520	2520	2520	2520	2360	2030	1710	1280	86,2	86,6	88,5	90,1	89,9	89,9	88,5	85,2	80,3
	+15%																		
	80	2240	2240	2240	2240	2240	2100	1810	1520	1135	84,4	85	87,1	88,8	89,9	89,1	87,2	83,5	78,4
	+15%																		
	70	1960	1960	1960	1960	1960	1840	1580	1330	995	82,2	83	85,2	87,2	88	87,5	85,1	81,2	77
	+15%																		
	60	1680	1680	1680	1680	1680	1375	1360	1140	850	79,5	80,8	82,8	84,8	85,5	84,9	82,6	79	75
	+15%																		
	50	1400	1400	1400	1400	1400	1310	1130	950	710	76,5	79	80	82,0	82,5	82	80,5	77,5	72,6
	+15%																		

- NOTE: (a) The outputs and efficiencies are not guaranteed for percentage gate openings but as fractions of load at any given head.
- (b) The efficiencies under outputs lower than 5/10 full load for any head are not guaranteed.
- (c) Efficiencies and outputs for all heads excepting the rated head are ~~not~~ purely indicative and are not guaranteed.
- (d) The Turbine shall be capable of delivering outputs to the extent of 15% over and above the rated output at the maximum head and proportionately higher outputs between maximum and rated head.
- (e) The efficiencies indicated under the gross heads of 144, 140, 130 and 120 ft refers to the outputs without the 15% extra capacity.

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FORM OF AGREEMENT(Local Indent No.F.O. No.3603-DL-17611-95758)

This agreement made the 30th day of October 1958 between M/S. Ansaldo - San Giorgio, ^{a firm in} Genova, Italy (hereinafter referred to as the "Contractor") which term shall include his heirs and legal representatives and the Governor of Mysore - ~~Stores Purchase Committee - Bangalore~~ - India (hereinafter called the "State").

AND WHEREAS the State having invited the tenders in the Enquiry No.14921 for the supply of Transformers required to Bhadra Reservoir Hydro Electric Project, and the contractor having accepted to supply the equipment in his letters Nos E.3/5304/4 of 26.2.58, E.3/7661/4 of 21.3.58, E.3/9081/4 of 23.4.58 and E.3/10631/4 of 29.5.58.

the Secretary, Stores Purchase Committee, on behalf of the

AND WHEREAS ~~the Chief Engineer, Hydro-Electric Construction Projects of Mysore on behalf of the State~~ having placed an order with the contractor for the supply of "Transformers required for Bhadra Reservoir Hydro-Electric Project" in S.P.C. letter No.51956 dated 13.3.58 as detailed in the schedule described here-under subject to the conditions and specifications detailed in the said enquiry No.14921.

AND WHEREAS the Contractor having accepted to supply Ansaldo - San Giorgio's Transformers as herein described in the Schedule and having furnished a security deposit of 5% of the value of this order, in the shape of Bank guarantee from a schedule bank for the fulfilment of contract.

IT is hereby agreed between the parties here to as follows.

- 1) The contractor shall supply equipment as per details of schedule of equipment and prices (See Annexure). *The State shall pay the contractor for the equipment supplied, at the prices stated in the schedule.*
- 2) Standards:- The construction and manufacture of Transformers and accessories shall be in accordance with the standards as detailed



STANDARD ELECTRICITY BOARD
ANALDO - SAN GIORGIO S.p.A. Genoa

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in specifications and agreed to by supplier.

3) Prices :- The prices given in the order are in Italian Liras for the material delivered F.O.B. port of shipment, and are firm, for prices indicated in Column 8 of schedule of prices.

The sales tax and other local taxes etc. ~~will be charged for extra, if payable~~ payable in India on the goods supplied, shall be borne by the State.

4) Currency of Payment :- Currency of payment is Italian Liras.

5) Terms of Payment :- The payment of ^{price} cost of the equipment shall ~~will~~ be made as follows, on presentation of necessary invoices.

- 20% of the contract FOB price when each single lot is ready for shipment
- 16% ^{the date of receipt of the contract from the contractor} twelve months after notice that each lot is ready for shipment
- 16% ^{after} twenty-four months ~~as above~~ from the aforesaid date
- 16% ^{after} thirty-six months ~~as above~~ from the aforesaid date
- 16% ^{after} forty-eight months ~~as above~~ from the aforesaid date
- 16% ^{after} sixty months ~~as above~~ from the aforesaid date.

An annual rate of interest of six per cent shall be ^{paid by} applied on deferred payments beginning from date of ^{receipt of the} notice that each single lot is ready for shipment.

The total amount of interest on all deferred payments shall be paid along with the last instalments to be paid five years after ^{the receipt of the notice from the contractor} notice that each lot is ready for shipment.

For the ^{deferred} ~~delayed~~ payments the State shall give a guarantee acceptable to the contractor.

6) INSURANCE ^{and shipping} :- Suppliers ^{shall} ~~should~~ contact the Trade Agent for the Government of Mysore, 28, Cockspur Street, London S.W.1., well in advance, and ^{the Trade Agent shall} ~~he~~ will arrange for the necessary insurance ^{and} of equipment from the port of shipment up to site. Destruction

7) Delivery :- The F.O.B. delivery of the equipment shall be ~~as follows~~ made on dates shown below against each item of equipment

15 MVA transformers	12-14 months	for 25-9-1959
9 " "	10 "	25-5-1959
2.5 " "	10 "	25-5-1959

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20-1-58 The above delivery periods are to be reckoned from the 25.2.58, ^{of particulars of import licence} date of receipt by the contractor of a letter from the State assuring that he had decided to issue a direct order.

Further, as the construction of the units was suspended on the 15.5.58 having the contractor ^{having} not received a satisfactory reply from the State regarding the guarantee to be supplied against the delayed payments, and as the work was resumed on the 15.10.58 following receipt of a communication that the matter would have been satisfactorily settled in a few days, the new contract dates for FOB Genova delivery are the following :

15 MVA transformers	from 25.7.59 to 25.9.59
9 " transformer	25.5.59
2.5 " "	25.5.59

8) Penalty for late delivery :- ^{Contractor shall be liable for} The penalty for late delivery of the material shall be ^{1%} of the contract price per week reckoned on the contract value of each complete delayed unit, ^{delivery of which has been delayed.}

The maximum penalty payable shall however not exceed 10% of the FOB value of each delayed unit.

Amongst the causes of force majeure also the following shall be included :

- non availability of ships for loading when the transformers are made ready at Contractor's Works
- delay of the State in approving the test certificates ^{beyond} ~~(not more than 15 days are allowed)~~ ^{such certificates} from the date of receipt of
- delay in carrying out the inspection by State's officer or representative, ^{beyond} ~~reasonable time~~ ^{beyond reasonable time}

9) Schedule of Technical particulars :- ^{shall} Should be as in the order form, modified for items 8 and 9 - exciting current.

10) Guarantee:- The contracting firm shall be responsible for replacing at site and free of cost any parts of plant and equipment that may prove faulty or fail by reasons of any of the clauses a, b and c stated below within one year after the plant has been put into operation by the ^{State} Government of Mysore or 20 months after the shipment, whichever is earlier. ³⁰

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- a) Quality and strength of material used.
- b) Adequate factors of safety for all parts of the equipment to withstand the mechanical and/or electrical stresses developed therein.
- c) Suitability of design and workmanship of the plant for conditions envisaged in these specifications.

11) Training of Engineers :- Necessary facilities shall be provided in the manufacturer's works for training two ~~departmental~~ ^{defined by the State} engineers in the manufacture, assembly and testing of equipment for a minimum period of one year. During the stay of the ~~departmental~~ ^{said} engineers at the manufacturer's works, each of them shall be paid It.Liras 100,000 (£.Stg.57) per month ^{by the contractor} ~~it is to be understood that all the charges for boarding and lodging will be borne by them.~~ ^{shall not} The ~~charges~~ ^{costs} here shall be borne by the contractors (tourist class air ticket).

12) Erection:- Erection ^{shall} ~~will~~ be carried out by the ~~Departmental~~ ^{State} Engineers. However the suppliers shall provide free of charge the supervision of erection, which ~~will~~ ^{shall} last for the period of erection of the equipment as well as for field tests

13) The conditions stipulated in the said S.P.C.Enquiry No.14921 form part of this agreement, except for clause 5. of the conditions (page 1) which shall not apply.

IN WITNESS WHEREOF the parties of this agreement have signed this indenture in the presence of the following witnesses.

Witnesses:-

In the name ^{of} Contractor
and under the Direction
of the Governor,

STABILIMENTO ELETTROMECCANICI RIUNITI
ANSALDO - SAN GIORGIO SECCO JOF AZIENDA
[Signature]
PURCHASER

Designation

5. SCHEDULE OF EQUIPMENT AND PRICES

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Description	Qty. required.	Basic price quoted FOB. (A)	Increase in price for providing condenser bushings, vide letter RM/E-460/10-5-1957 (B)	S p a r o o (C)	Total price i.o., (A plus B plus C)	Increased price to make Prices firm vide letter No. RM/E-460/12867 dated 6th August 1957.
1.	2.	3.	4.	5.	6.	7.
15,000 KVA, 50 Cycles, 3 Phase, 11,000-66,000 Volts, Delta-Star, forced oil, water cooled, transfor- mers with +2.5%+5%+10% taps on H.T. Windings, etc., com- plete for outdoor instal- lation.	Three	Italian Liras 55,125,000	Italian Liras 304,500	- Two bushings 66KV = 321,417 - One winding column with oil = 2,520,000 - Two bushings 11KV = 26,250 - Six sets of glasses for air vent = 1,750 - One set of pack- ing = 31,500	Italian Liras 58,330,417	Italian Liras 62,705,198
Oil for first filling +10% extra in sealed non-returnable drums	For three tran- sformers	1,417,500	—	—	1,417,500	1,523,813
9,000 KVA, 50 cycles, 3 Phase, 11,000-66,000 Volts, Delta-Star forced oil water cooled tran- sformers with +2.5%+5%+10% taps on H.V. windings, etc., complete for outdoor in- stallation	One	14,262,500	101,500	-One winding column complete with oil = 1,750,000 -Six sets of glasses for air vent = 1,750 -One set of packing = 31,500	16,147,250	7,358,294
Oil for first filling +10% extra, in sealed non-ret. drums	For one transf.	411,250	—	—	411,250	442,094
2,500 KVA 50 cycles, 3-phase 11,000-66,000 Volts Delta- Star self-cooled transfor- mer with +2.5%+5%+10% taps on H.V. winding etc., com- plete for outdoor install.	One	8,540,000	101,500	-One winding column complete with oil = 1,015,000 -Six sets of glasses for air vent = 1,750 -One set of packing = 13,750	9,674,000	10,399,550
Oil for first filling +10% extra, in sealed non- returnable drums	For one tran- sformer	350,000	—	—	350,000	376,250
						92,809,199/- Italian Liras

Charles J. Martin

Extra cost for Impulse Test:-

Impulse test on 15 MVA transformer	Italian Liras	201,250 per transformer.
-do- 9 " "	"	183,750
-do- 2.5 " "	"	140,000

Extra cost for heating test :-

Heating test on 15 MVA transformer	Italian Liras	166,250 per transformer
-do- 9 " "	"	157,500 "
-do- 2.5 " "	"	140,000 "

Note :- The impulse and temperature rise tests on the transformers shall be performed only on specific instructions from the Purchaser at the extra cost indicated in the above schedule.

STABILIMENTI ELETTROMECCANICI RIUNITI
 ANSALDO - SAN GIORGIO Società per Azioni
Charles Montan

14. PACKING:

The materials shall be securely packed so as to withstand rough handling in transport over land and sea.

15. ACCESSORIES:

Each transformer shall be provided with the following accessories:-

External heat exchangers, complete with valves for adjusting and closing the water and oil circulation.

Electrical pumps for the oil circulation suitable for 230-V, 50 Cycles, single phase or 400-Volts, 50 Cycles, 3 Phase.

Pipings to couple tank, pump ~~accessories~~ coolers or heat exchangers.

Device for remote indication of water and oil circulation failure.

Oil conservator with two closing cocks, settled so as to be removed filled with oil; plug, drain valve and air intake.

Oil sampling cock.

Drain valve.

Regulation and safety valve, with alarm contacts.

Two threaded joints for connection to the oil filter, one on the upper and one on the lower parts of the tank.

Dial thermometer with indicator and insulated contacts, adjustable according to the maximum safety oil temperature.

Lifting lugs for the whole core.

Note: All constructional details not specified here in and referred to - core - tank - windings - bushings, - protections, etc., shall be in compliance with the tender specification requirements. The equipment shall be complete with the spares as indicated in column 6 of the Schedule of Prices.

Name-plate and diagram of connections, with wordings in English.

Set of sliding wheels with a single flange, suitable for bidirectional transport of the transformer.

Bucholz relay.

Winding temperature indicator

16. TESTS:

The suppliers shall furnish copies of test certificates of materials used for construction, and also on the prescribed tests (vide Clause 4.15 of specifications) conducted on the equipment after manufacture and assembly in their works. They shall provide full facility for inspection by other officers or representatives appointed by the purchaser for the purpose during the course of manufacture, assembly and testing. They shall also forward monthly progress report on manufacture of various equipment ordered. Two advance copies of the test certificates shall be sent for the purchaser's approval by Air Mail. The equipment shall not be shipped before the purchaser's approval for the test certificates is received. 4 additional copies of the test certificates shall be despatched along with the shipping documents.

17. DRAWINGS:

Three sets of detailed drawings, certified for construction work at site, shall be despatched by the contractor within two months after the order is placed and all details are ~~subject~~ supplied. Three further sets of prints and one set of tracings on cloth or velographs shall be supplied at the time of shipment. One additional cloth bound copy, certified as contract drawings, shall also be supplied.

18. INSTRUCTION BOOKS:

Instruction books in triplicate, containing full instructions for operation and maintenance of the plant shall be supplied free of cost, sufficiently in advance of shipment of the material.

IN WITNESS WHEREOF the parties of this agreement have signed this indenture in the presence of the following - witnesses.

Witnesses:

Contractor

In the name of an under the Direction
of the Governor,

PURCHASER

Designation.

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SCHEDULE OF TECHNICAL PARTICULARS:

Item No.	Description.	15,000 kVA.	9,000 kVA	2,500 kVA
1.	2.	3.	4.	5.
1.	Maker's name and country.	ANSALDO - SAN GIORGIA, ITALY.		
2.	Normal full load output for 50°C temperature rise - kVA.	15,000	9,000	2,500
3.	Continuous output, B.S. rating - kVA.	-	-	-
4.	Vector group number as per B.S.S.	-	32 Yd 1	-
4.	Maximum temperature rise after full load run followed by two hours overload of 25 per cent (Ambient 45°C):			
	a) of oil by thermometer °C	-	55	-
	b) of windings by resistance °C	-	65	-
5.	Core loss at normal voltage and frequency - kW.	18	13.5	6
6.	Core loss at 110 per cent voltage and normal frequency - kW.	24.5	18.5	8.3
7.	Copper loss at normal full load current - kW.	90	60	21.5
8.	Exciting current at normal voltage and frequency - %.	0.4	0.45	0.7
9.	Exciting current at 100 per cent voltage and normal frequency - %.	1.6	1.8	2.8
10.	Power factor of exciting current at normal voltage and frequency.	0.3	0.33	0.34
11.	Efficiency at 75°C - (In the efficiency calculations, the rating absorbed by the motor pump for forced oil circulation in relation to the solution with water cooling of the 15,000 and 9,000 kVA transformers has not been taken into consideration.)			

Contd...

43)

1.	2.	3.	4.	5.
a) on 100% load 1.0 P.F.		99.28	99.19	98.81
b) on 90% -do-		99.33	99.23	98.97
c) on 80% -do-		99.37	99.28	99.04
d) on 70% -do-		99.41	99.32	99.06
e) on 60% -do-		99.44	99.35	99.09
f) on 50% -do-		99.45	99.37	99.10
12. Zero sequence impedance ohms.	Zero sequence impedance will be specified at the time of final design.			
13. Reactance drop on full load - %.		8.98	8.97	7.96
14. Resistance drop on full load - %.		0.6	0.667	0.86
15. Impedance drop on full load - %.		9	9	8
16. Regulation at full load 1.0 P.F. - %.		1.00	1.07	1.18
17. Regulation at full load 0.85 PF. - %.		5.51	5.55	5.11
18. Tappings on H.T. windings - %.	-----+2.5%, +5%, +10%-----			
19. a) Maximum flux density in the core with normal voltage and frequency CGS Lines/Sq.Cm.		-----	15,500	-----
b) Maximum flux density in the core at 110% voltage and normal frequency CGS Lines/Sq.Cm.		-----	17,050	-----
20. Maximum current density in copper of the H.T. windings - Amps/Sq.mm.		2.85	2.82	2.75
21. -do- L.T. windings - Amps/Sq.mm.		2.85	2.82	2.75
22. Minimum clearance to earth.-				
a) of L.T. winding in oil.		-----	85 mm	-----
b) of H.T. winding on oil.		-----	85 mm	-----
23. Impulse strength of H.T. winding (positive wave) (Withstand value) kV.		-----	350	-----
23a Minimum Dry test voltage for winding - kV.				
24. Nature of insulation of laminations.		-----	Varnish	-----
25. Details of painting at works and at site.	One coat of red-lead paint and 2 coats (one to be applied at site) of ash-coloured linseed oil varnish.			

(4)

1.	2.	3.	4.	5.

26. Quantity of oil for the transformer - Gallons.		1130	980	815
<u>B U S H I N G S:</u>				
27. Type of bushing and make.	Oil filled condenser type.			
28. Dry flash over at 50 cycles at standard conditions as per BSS or AIEE Test Code/kV.		230	95	95
29. Wet flash over at 50 cycles at standard conditions as per BSS or AIEE Test Code/kV.		180	70	70
30. Dry impulse test voltage at full wave 1/50 m.s. - kV.		400	130	130
31. Maximum withstand voltage at 50 cycles impulse wave -				
a) D r y. kV.		200	82	82
b) W e t. kV.		160	61	61
c) Impulse. kV.				
32. Quantity of oil - Gallons.		2.65	2.65	2.65

Clarifications furnished by you vide your letter No. RM/E-460/7940/ dated 10-5-1957:-

1. Stampings used for the formation of the core are cold rolled.
 2. The transformers will be able to withstand a terminal short circuit for a maximum time of 5 seconds.
 3. The transformer tanks are designed to withstand a vacuum of 600 mm Hg.
-

GOVERNMENT OF MYSORE

No. PWD 18 BHE 58.

E. 2

Mysore Government Secretariat,
VIDHANA SOUDHA,

Dated, Bangalore 5th Dec. 1958.
Agrahayana Saka Era 1880.

FROM Under
The / Secretary to the Government of Mysore,
Electrical Department.

To
The Chief Engineer,
Hydro Electric Construction Projects,
Bangalore.

Sir,

Sub: Bhadra Hydro-Electric Project - Contract
documents for Turbines ordered on M/s.
Neyrpic, France and Transformers ordered
on M/s. Ansaldo, St. Georges, Italy.

With reference to your letter No.3/10/5/G/1209 dated
the 15th November 1958 on the above subject, I am directed
to return herewith the draft contract documents duly -
scrutinised by the Law Department.

Yours faithfully,

9C [Signature]

(E. Govindarajulu Nayak.)
Under Secretary to Government.
✓ Electrical Department.

vbk/2.

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THIS agreement made this.....day of.....1958
between Etablissements Eyrolle, Avenue De Beauvert, Grenoble, France (here-
inafter referred to as the "Contractor"), which term shall include its successors
and legal representatives and the Governor of Mysore (hereinafter called the
"Government").

And whereas the Government having invited the tenders in Stores Purchase
Committee Enquiry No.14919 for the supply of "Hydraulic Turbines, Valves,
Automatic Governors and Associated Equipment" for Bhadra Reservoir Hydro-
Electric Project and the contractor having offered to supply certain equip-
ment in its letter:-

1. No.T-529/1916 dated 9th May 1957
2. No.EB-PTa/GPB dated 4th October 1957
3. No.T-529/4560 dated 11th November 1957
4. No.T-529/6542 dated 9th December 1957
5. No.T-529/6674 dated 14th December 1957
6. No.T-529/6766 dated 7th January 1958.
7. No.EB-PTa/ABO dated 29th May 1958.

And whereas the Secretary, Stores Purchase Committee on behalf of
the State having placed an order with the Contractor for the supply of
Hydraulic Turbines, Valves, Governors and associated equipment of the
Bhadra Reservoir Hydro-Electric Project in SPC/BI.49024 dated 6th January
1958 as detailed in the Schedule described hereinafter and the general
conditions and specifications detailed in the said Enquiry No.14919 and
the Schedule of Deviations annexed.

And whereas the contractor having accepted to supply the Hydraulic
Turbines and associated equipment, as herein described in the schedule
and having furnished a security deposit of Rs - - - - - for the fulfilment
of the contract.

It is agreed between the parties hereto as follows:-

1. The Contractor shall supply the Government goods detailed in the
Schedules hereunder and the description and quality of the goods shall be
as stated in the Schedules. The Government shall pay the contractor for
the goods supplied at the prices stated in the Schedule.

2. The security deposit furnished by the contractor shall be forfeited
at the discretion of the Government in the event of non-fulfilment of any of
the terms of this contract.

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B. In consideration of the Contractor having agreed to supply the above mentioned equipment, the Government shall make payments as follows:-

- a) 50% of total F.O.B. price of the order under this Contract pro-rata of the value of each consignment against presentation of shipping documents.

Within months from 17-7-1958 the Government shall open an irrevocable letter of credit in Citibank Manhattan Bank, Paris (a French Bank in Paris) for 50% of the total F.O.B. price of the order. The letter of credit shall be valid for a period not less than the delivery periods stated hereunder and shall be extended, if necessary.

Against this letter of credit the Contractor shall present the respective shipping documents, made out "to order" of the Government to the above Bank and the contractor shall be paid 50% of the invoiced FOB value of each consignment.

- b) Balance 50% of FOB price of the contract in ten equal half yearly instalments, the first instalment maturing 30 months after 17th July 1958, the other nine instalments shall be paid at intervals of 6 months, (the first of the said 9 instalments being payable 6 months after payment above,) however subject to the condition that the shipping documents of last consignment has been received. In the event of the delivery period being extended by mutual consent, the payment of instalments shall be postponed by the corresponding period.

The balance of F.O.B. price stated in paragraph (b) above, shall carry interest of 6 per cent per annum commencing from 17-7-1958 or from the date of completion of delivery of goods, whichever is later. Along with each instalment the corresponding interest shall be paid.

A Bank guarantee ~~must be presented~~ for the deferred amounts and interests thereon shall be provided by the Government in the enclosed form.

IN WITNESS WHEREOF the parties to this agreement have signed this instrument in the presence of the following witnesses.

Contractor.

Witnesses:

In the name of and under the direction of the Governor.

SIGNATURE.

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1.00 - GENERAL CONDITIONS

The equipment listed below shall be manufactured according to the enquiry specifications issued by the Stores Purchase Committee - Section 1 and 2 - Enquiry Enquiry No. 14919 unless otherwise modified and accepted by the ^{Government} purchaser in writing prior to placing this order and the schedule of deviation, appended in clause 20.00. The order shall also be subject to the general terms and conditions for delivery, penalty for late delivery, etc., collected below. The General conditions of contract for supply and Erection of equipment issued by the Government of Mysore through S.B.C. shall also form part of this contract, unless otherwise modified hereunder.

2.00 - SCHEDULE OF THE EQUIPMENT

2.01 - RIGHT BANK STATION & RIVER BED STATION TURBINES:-

Each of the units shall be complete with the following major items and such of the minor items as are not specifically listed - here but are necessary for the satisfactory operation of the equipment covered by this order.

- 1- Stay ring of welded steel plates or of Cast Steel.
- 2- Spiral casing of welded steel plate
- 3- Test ring (common for both Right Bank & River Bed Units).
- 4- Wicket gate operating mechanism consisting of -
 - 1 - Head cover with necessary guide bushings.
 - 1 - Bottom ring made of cast steel plate with the necessary guide bushings.
- 5 - Wicket gate corve-meters
- 6 - connecting rods for wicket gate corve-meters
- 7 - Regulating ring made of welded steel plate
- 8 - Runner case
- 9 - Runner shaft made of open hearted carbon steel with coupling bolts
- 10 - Cast steel runner with stainless steel runner blades
- 11 - Mechanism for adjusting the tilt of runner blades
- 12 - Runner blade corve-meter with piston and piston rod.
- 13 - Mounting device for the runner (for two units).
- 14 - Oil supply head, control valve and blade restoring mechanism.
- 15 - Pit lining of the turbine pit in order to provide supports for the wicket gate corve-meters.
- 16 - Runner shaft sealing arrangement.
- 17 - Turbine guide bearing with -
 - 2 - oil level indicator with low level contacts for alarm.
 - 1 - thermostat relay employing vapour tension system for alarm and shut-down.
 - 3 - temperature detectors

- ### 011 Programs Governing Systems-

- This equipment shall also supply air for the generator brakes in co-ordination with generator manufacture.

NOTE: The supply of pipes connecting spiral casing to inlet valve of turbine is not included. However, drawings of the same shall be provided by the contractor free of charge.

1) Geoproped air plan for reversing installation and connecting
water level when operating as a synchronous condenser.

Both for Night Bank River had units consisting of pressure receiver, compressed air plant, hydro-jector and connecting pipe.

Only for River bed units consisting of drainage pumps with intakes.
float valves and connecting pipes.

Chamber plating for the turbines, 3 sets for boy-boards for tools
and special tools common for both the turbine stations

The camp for this station shall comprise of:-

- 2 - Estimated shaft Brachio Turtles compressing -
2 - spiral casing
1 - runner of brace

- 1 - runner shaft
- 1 - hand cover
- 1 - bottom ring
- 1 - runner shaft cooling device
- 1 - set of vent stool guide vane
- 1 - set of bearings for guide vane transmission
- 1 - set of links and levers
- 1 - regulating ring
- 1 - Double acting oil servomotor
- 1 - connecting rod
- 1 - turbine bearing complete with thrust collar and pedestal.
- 1 - draft tube cone, head and diffuser

1 - Governing System complete:-

- 1 - Governor actuator
- The governing pump
- The cam tank.
- 1 - butterfly valve.

NOTE: The connecting pipe between the inlet valve and the spiral casing is not included. However the necessary drawings has to be supplied by the contractor free of charge.

Tools and instruments for Acceptance Tests at site:-

The necessary equipment for the tests shall include:-

- 7 - current rotors
- 1 - recorder with 24 pens
- 1 - weight meter for load measurement.
- Miscellaneous materials including small piping and wiring, fittings, valves, etc.
- Consumable goods.

In addition to the major items listed above, the necessary piping for oil, grease, compressed air and water shall also be supplied by the contractor. Compressed air piping relevant only to governing system and monitoring system shall also form part of the supply. The supply of pipes for water circuits shall include for those relating to the governing equipment and the cooling water system for the turbine bearing and governing system.

The contractor shall also furnish the following items:-

- a) i) All limit switches indicating the position of the oil in the pressure receiver and the main oil cam; limit switches for the inlet valve and overspeed protection device.
- ii) Indicating instruments such as oil pressure indicators, speed indicators, water pressure indicators and compressed air pressure indicators.
- iii) Necessary visual alarms.

- b) The necessary pressure gauges for the oil pressure water pressure and the compressed air.
- c) Starters and protective gears for all motors.
- d) Permanent magnet generator for position motor.
- e) Grease gun for the lubrication of the wrist gate.
- f) Duplicate strainers for the guide bearing lubricating oil and the governor oil
- g) Guard for the lower part of the coupling flange.
- h) Chains for handling the rotating parts of the turbine.
- i) Dual Solen indicators for ^{indication of} load limiting, speed level adjustment, speed drop etc. and Controls for load limiting, speed level adjustment etc.
- j) Thrust Bearing and Guide bearing with thermostat for the indication of the temperature.
- k) Coupling bolts for coupling the ~~turbine~~ turbine and Generator.

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LIMITS OF CONTRACTOR'S SUPPLY

The following items will not form part of the contractor's supply:-

- Penstock extension upstream of the main inlet valve. The downstream flange of the penstock shall be finished by the Purchaser as per Contractor's drawings.
- Connection pipe between main inlet valve and spiral casing. However the necessary drawings for its drawings shall be furnished.
- Stop logs to be placed at the exit of the draft tube and their guides.
- Road rails, stair cases and ~~any other~~ ^{hatchways required for removal of parts being supplied by the turbine manufacturer.} ~~other than that~~ for taking off oil piping.
- Metallic structures for supporting the Governor and Governor bearings.
- All trings and Cables external to the Governor Cabinet. The Governor Cabinet on which the Contractor's items are situated shall be wired before dispatch and shall be provided with terminal boxes for connecting the wires and supply cables included in other supplies.
- All Electric relays
- Switchboard in the power station control room and its appliances.
- Equipment feeding clean cooling water under adequate pressure to cooling circuits.
- Foundation works which shall be made by the Purchaser according to the contractor's drawings. Reinforcement drawings are not included in the Contractor's supply.
- Lifting Gears and their accessories. The Contractor shall however supply a set of slings for lifting the turbine rotating parts.
- Final painting of the machines after completion of erection. However the Contractor's equipment shall be shipped to site with corrosion resisting paint. The embedded parts shall be covered with a special paint.
- Erection Tools. The contractor shall however supply all non-standard tools for erecting and dismantling of the equipment. The Contractor shall also supply two sets of spanners mounted on boards.
- Oil and grease for first filling of Governor and also handling
- All materials such as lights, water, electricity, compressed air, light machining facilities, welding sets, pressure test pump and consumable goods like grease, oil, cotton waste etc., and services of skilled and non-skilled Indian personnels in connection with the erection of the equipment.

All the prices given above include see-worthy packing wherever required. The F.O.B. prices are firm and not subject to any variations, and are in transferable £.sterling.

Government

Should the ~~purchase~~ ^{Government} so desire, the Contractor shall arrange for the shipment of the machinery for F.O.B. European Port to C.I.F. Madras on behalf of and on account of the ~~Purchaser~~ ^{Government}, in which case the expenses involved shall be invoiced to the ~~Purchaser~~ ^{Government} according to actual expenses.

Government

The ~~Purchaser~~ shall provide for all incidental and statutory charges, such as customs duty, clearances, loading and unloading, railway freight and transport upto site, octroi, sales and terminal taxes which will be applicable at the time of supply.

8. Charges payable to the contractor for the services of Foreign Personnel for supervision of erection, tests and maintenance at site:

<u>Item No.</u>	<u>Details of personnel</u>	<u>Rate per Calendar day</u>
1	Specialist or Maintenance Engineer ...	£.10 + D.25
2	Erection Supervisor ...	£.10 + D.25
3	Erector ...	£. 6 + D.25

These daily rates are applicable per calendar day from the date of leaving home upto date of return to France. They are based on a maximum working time of 8 hours a day, limited to 44 hours a week. For each working hour over 44 hours a week, the following extra charges are applicable.

i) Specialist or Maintenance Engineer ...	£.2-10- 0
ii) Erection Supervisor ...	2-10- 0
iii) Erector ...	1-10- 0

These extra charges are subject to increase by 6 sh. for the Specialist Engineer and Erection Supervisor and by 3 sh. for the Erector in case they work on Sundays, Bank holidays or for night work after 10 p.m.

Actual travelling expenses by air, rail and road from Cumbles to site and return for the personnel and their luggage shall be chargeable to the ^{Government} Purchaser. The ^{Government} Purchaser will provide free of charge suitable lodging quarters at site, furnished with necessary accommodation, water, electricity, lighting, fans etc., free transport to and from site if the lodging accommodation is more than a mile from site, and free medical assistance to the personnel. The ^{Government} Purchaser shall also make payment of all taxes due in India for all foreign personnel employed by the Contractor for the purpose of carrying out the supervision of erection.

The above enumerated rates and terms are based on the official Indian Rates (D.O.S.P.) existing in France on March 2nd, 1957, and they will be adjusted at the time when starting the erection, if necessary, according to the following formulae:

$$R = R' \frac{C}{C'}$$

In which

R = Daily rates stated above

R' = readjusted rates

C = salary index on the 2nd of March, 1957

C' = salary index at the time of starting the erection.

^{Government}
The ^{Government} Purchaser shall provide free of charge chilled and unchilled Indian personnel.

3. Schedule of Delivery of the plant D.O.S. European Parts

	<u>Estimated months</u>	<u>Delivery</u>
Items 2(a) & 2(b) - (Turbo for the Right Bank Station and Main Inlet valve)	02 months	04 months
Items 2(a) & 2(b) - (Turbo for the Left Bank Station and Main Inlet valve)	20 months	
Items 2(a) & 2(b) - (Two Turbos for the River Bed Station and two main Inlet valves)	22/23 months	03/02 months
Item 6 type and including Item 20 (Accessories and Spares)	Together with the respective turbines.	

The above mentioned delivery periods shall be reckoned from 17th July 1958. These delivery periods are fixed on the basis that the drawings submitted by the contractor for approval of the Government will be returned to the Contractor within 20 days of the receipt of the said drawings. Should there be any delay in returning the drawings the delivery periods shall be extended by the actual period of delay beyond 20 days, in returning the drawings.

PENALTY FOR LATE DELIVERY

The penalty for delivery of the materials later than the periods indicated above or such extension which may be mutually agreed upon shall be at the rate of 2% of F.O.B. price of that part of the equipment that is delayed subject to a maximum penalty of 10% of total F.O.B. price of such machine or machines delayed excluding spares. The above penalty shall not however apply if the delay is due to causes beyond the control of NEYRPIG (Forces majeure) and in any case where it does not cause any loss to the purchaser.

TERMS OF PAYMENT

Subject to any deductions, which the Government may be authorized to make under the contract, or subject to any additions or deductions provided for elsewhere under this contract shall be entitled to payment as indicated in the Bank Guarantee form annexed hereto.

TERMS OF PAYMENT FOR SUPERVISION OF ERECTION:-

The monthly charges for supervision of erection will be paid to the contractor against bills submitted monthly by the contractor.

IMPORT LICENCE

Import Licence No. 016242-001-IMP dated 18th May 1958 has been granted by U.O.I. for importing the turbines. The receipt of Import Licence has been intimated to the contractor in the ^{C.E. H.C.P.S.} Purchasing Office letter No. 3-13-3-4399-900 dated 17th July 1958 and the delivery period shall be reckoned from the date.

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6.60 GUARANTEED PERFORMANCE PARTICULARS.

Sl. No.	Particulars.	Right Bank Unit.	Left Bank Unit.	River Bed Unit.
1.	Cross head.	Max. 71 Rated 60 Min. 19	144 115 79	164 140 99
2.	Net head.	Max. 69.5 Rated 53.5 Min. 13.5	145 144 70.5	162 137.5 97.5
3.	Corresponding minimum TOL.	+107.5	+30.0	+22.0
4.	Cavitation limit output.	As per Drawing M-BH-1(a)	As per Drawing H-4048	As per Drawing H-3970
5.	Full load output	Max. 10150+153 Rated 10150 Min. 1500	2300+153 2300 1420	17000+153 17000+153 17000
Notes:- (Full load outputs under maximum and minimum not guaranteed but full load output under rated head is guaranteed)				
6.	Guaranteed efficiency (per cent) at rated head and at			
	i) 100% full load output	87.5	83.8	90.8
	ii) 75% -do-	91.5	89.0	91.6
	iii) 50% -do-	90.9	82.5	83.5
7.	Normal speed.	214	500	250
8.	Runaway speed-a) Practical	580	1000	610
	b) Theoretical.	610	1000	690
9.	Minimum factor of Safety.		2/3 elastic limit	
10.	Maximum unbalanced hydraulic thrust(tons)	125	10	285
11.	Sensitivity of the Governor.	4/10,000	10/10,000	4/10,000

Notes:- The outputs and efficiencies of the turbines for outputs at heads other than the rated head are not guaranteed.

	Head in ft.	Output in BHP.	Efficiency.
a) Right Bank Station.	71	11,650	84%
b) Left Bank Station.	120	2,970	85%
	130	3,200	87.5%
	140	3,200	87%
	144	3,200	86.5%
c) River Bed Station.	210	18,200	86.8%
	120	19,200	86.0%
	130	19,500	88.1%
	140	19,500	89.3%
	150	19,500	90.1%
	160	19,500	90.4%
	164	19,500	90.5%

0.00 - GENERAL REQUIREMENTS

0.01 - Thrust Bearings- The turbines offered for Right Bank and Liver Dam Stations shall be suitable for operation with the thrust bearing resting upon the lower bracket of the generator. The bearing arrangement for the Left Bank unit shall be decided in consultation with the generator manufacturer.

Turbine Rating and Rotational Speed- The turbine for the Right Bank Station shall be a 210 HPI, vertical Kaplan type machine. The turbine for the Left Bank station shall be of the horizontal Francis type with a speed of 250 RPM. The two turbines for the Liver Dam Station shall be of the vertical Kaplan type with a speed of 250 RPM. ^{The River Bed.} ~~The Right and Left~~ Bank turbines shall be capable of delivering output to the extent of the rated output of 17,000 HP each at the minimum gross head of 90 feet and 10% extra output at heads higher than 90 feet depending on the available head.

Runner and Runner Blade Control Apparatus- The runner shall consist of a cast steel hub with adjustable blades mounted on the periphery. The runner blades shall be cast in stainless steel. The entire runner assembly shall be balanced statically at the contractor's works and be capable of being removed through the stator bore.

The servo-motors for adjusting the tilt of the runner blades shall be located above the runner hub.

Shaft- The shaft shall be made of open-heart carbon steel properly heat treated with integrally forged flanges for connection at one end to the turbine runner and at the other end to the generator's shaft.

If it is found on final collaboration with the generator manufacturer that the shaft is long it will have to be increased over and above that indicated in the tender, the extra cost of shaft for coupling the two shafts shall be equally borne by the turbine and generator manufacturers.

Speed Ring- The speed ring shall be composed of stay vane nose of cast steel plates, built in two elements to facilitate handling. Necessary flanges and bolts shall be provided to erect the two elements at site.

Spiral Casting- The spiral casting shall be of steel plate construction with successive steel plates welded to the speed ring and to each other. The entire speed ring shall be drilled and matchmarked at the manufacturer's works.

Head Cover- The head cover shall be of welded steel plate construction and shall provide the necessary support for the guide bearing. Also they shall be provided with bracing members for the guide vane stems.

Hydraulic Ring- This ring shall be of stainless steel construction and shall be provided with flanges for bolting it to the bottom ring.

Guide Mechanism- This ring and the guide apparatus shall comprise of:

One - Set of guide vanes cast integrally with their transoms.

One - Gate operating ring of welded steel plate.

Two - Servo-motors to operate the guide vanes under the governing system.

The necessary connecting rods shall also be provided for servo-motor operation.

Draft Tube- The draft tube shall have a profile so that excavation is a minimum and efficiencies obtained high. The draft tube cone shall be lined with steel plate with a section where the diameter is 1.4 times the diameter of the exit cone.

Pressure Oil Governing System- The essential items for the governing system shall be provided.

The Governor consisting of Turbine type to consist of actuator head, gate limiting device, speed adjusting device, speed drop adjustment, automatic start-stop, speed indicators and recentering connections.

The Governor Motor consisting of Self excited to supply the generator motor shall be of the friction driven type.

The Primary Oil Pumping System:- Supplying of pumping oils, pressure tank, pump tank and the compressed air equipment.

The Governing Panel:- The governor and its auxiliary components shall be housed in a fully enclosed sheet steel panel of neat appearance.

The necessary controls, gauges, relays should be mounted on the governor panel to centralize the controls. And relays indicators for indication for load limiting device and speed level adjustment, speed ~~etc.~~ etc., shall also be included.

droop

0.03 - The Main Inlet Valve:- The valve body shall be of fabricated steel plate and one end shall be bolted to the downstream end of penstock flange.

The valve ~~body~~ ^{disc} shall be either of cast steel construction or of welded steel plate.

The bypass valve and its piping shall have a diameter sufficient to admit the correct discharge for the piping operations.

The valve shall be complete with dismantling joint and all other accessories necessary for satisfactory operation and maintenance.

The Operating Mechanism:- The inlet valve shall be operated by an oil operated servomotor and a counterweight. The oil under pressure shall be supplied by the governing system of the main turbine.

0.04 - Accessories and Equipment:- The necessary counterweight equipment with the pressure tank, compressed air system, hydrojector and piping shall also be supplied.

The supply shall include for all special tools and diagram-plotting around the turbine pit, governing cabinet, etc.

0.05 - Materials, Workmanship and Manufacture:- All the equipment shall be manufactured with new and first quality materials and according to the most recent standards and practices. All the materials used will be in accordance with the French official standards of AFNOR (Association Française de Normalisation). The valves and electrical appliances shall be in accordance

with the Standard U.S.A. standards (Under the Symbols of 1' Electrical '1')
special type with casters including insulation and suitable for operation
under 400 volts, 60 cycles, 3 phase, A.C. power supply and 110 volts D.C.
power supply

9.00 - QUALITY AND STRENGTH

The contractor shall be responsible for replacing at once and free
of cost any parts of plant and equipment that may prove faulty or fail by
reason of any of causes (a), (b), (c) or (d) stated below within one year
one day after the plant has been put into operation by the Government or
thirty or 90 months after the shipment, whichever is earlier.

- a) Quality and strength of materials used.
- b) Adequate factor of safety for all parts of the equipment,
to withstand the mechanical and/or electrical stresses
developed therein.
- c) Suitability of design and construction of the plant for
the conditions envisaged in these specifications.
- d) The efficiency, temperature rises and other performance
data furnished for the plant and the schedule of per-
formance, etc., indicated in the drawings as far as
they are guaranteed.

10.00 - THE OPERATION OF THE PLANT

10.01 Should the operation of any piece of equipment show that it
does not conform with the guarantees and/or requirements, the ~~contractor~~ Government
reserves the option to accept or reject the equipment and to direct the
contractor to at once proceed to furnish such new parts as may be necessary
to make the equipment meet the guarantees and other requirements. All ex-
penses for furnishing and of installing new parts or alterations to exist-
ing plants shall be borne by the contractor.

10.02 Guarantee for output and efficiency - The output of the
turbines at full gate opening, when operating at the rated net head and
their efficiencies at the above heads and when delivering 50%, 75% and 100%
output shall be guaranteed under penalty indicated below, with a maximum
and tolerance of 1% and a rejection limit of 4%. For purposes of comparison,
arithmetical mean of the guaranteed efficiencies at 100%, 75% and 50% output

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shall be compared with the arithmetical mean of the guaranteed values. The penalty levied shall be as indicated below for each per cent difference between the measured and guaranteed efficiencies. However, the total penalty for turbine equipment excluding spares, shall be to be limited to 10% of the F.O.B. price of such equipment.

Five Red Station Turbines	Rs. 55,000/-
Eight Black Station Turbines	60,000/-
Eight Black Station Turbines	10,000/-

10.02: Cavitation Guarantee:- The loss of material due to cavitation shall not be more than the figures derived from the following formulae. The duration of the guarantee shall be either 0,000 hours of operation or 20 months whichever is shorter.

Loss of material in the runner in pounds	0.002	) For Kaplan turbines.
Loss of material in the discharge ring in pounds.	0.002	

Where D = Diameter of runner in feet.

During the period of the guarantee the operation of the turbine at overloads and partial loads less than 10% of the rated output would be not restricted to 500 hours only.

Should the runner and /or discharge ring suffer from excessive pitting due to cavitation, as defined above, the contractor shall undertake at his own cost to repair the pitted portions of the runner and discharge ring by stainless steel welding followed by grinding to a smooth surface and shall agree to extend the same guarantee in this respect for the periods as indicated in para 1 above from the date the unit is repaired and put into regular service. If within the guaranteed period, inspection reveals that cavitation guarantee is not maintained, the contractor shall be supply a full set of new runner blades and/or discharge ring free of charge delivered at site.

11.00 - OBLIGATIONS OF THE GENERATOR MANUFACTURER:

The contractor shall fully collaborate with the generator manufacturer in all respects to ensure satisfactory erection and operation of the machine and no extra charge will be paid to the contractor by the ^{Government} ~~purchase~~ for the same.

12.00 - ARBITRATION:

In case of any dispute, the Indian Arbitration clause will come into force.

13.00 - TRAINING OF EXPERTS:

The contractor shall provide necessary facilities for the training of two Engineers deputed by the Government of Mysore in the manufacture, design, assembly and testing of the equipment. The contractor shall provide for these Engineers free of charge meals at the mess of the contractor plus a monthly allowance of 80,000 French Francs each, the lodging however shall be to the Engineers' account.

The training period shall be limited to six months.

14.00 - PACKING:

All parts shall be securely boxed, crated and protected against mechanical damage as well as corrosion by sea-water.

All packing dimensions shall not exceed the following ⁱⁿ limitations:-

- 1) Maximum dimensions of a crate that can be loaded on metro-gauge of Indian Railway, as indicated in purchaser's specification drawings.
- 2) ^{Dimensions} ~~Maximum~~ of extra-metro-gauge wagon as per Drawings Es. 712-103 and 712-152.

The maximum weight of the heaviest crate shall be 25 tons.

15.00 - INSURANCE

The contractor shall be responsible for the insurance of the equipment from manufacturer's works until delivery of the equipment V.C.B. Port of shipment. He shall contact the Trade Agent for Mysore in London, well in advance of the shipment of the equipment for further insurance of the equipment upto the destination (M. W. I). He will arrange for the necessary insurance.

16.00 - SHIPMENT

The contractor shall contact the Trade Agent of the Government of Mysore in London well in advance of shipment regarding shipment of the

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equipment and he will arrange for the same.

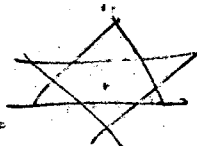
17.00 - SECURITY DEPOSIT

A security deposit of 5% of the value of the order in cash or in the shape of a bank guarantee from a scheduled bank acceptable to the purchaser shall be provided by the contractor. The security deposit shall be returned after expiry of the guarantee period indicated in clause 8.00. The Security Deposit furnished by the contractor or any person thereof shall be forfeited on the absolute discretion of the Government in the event of non-fulfillment of any of the terms of this contract.

18.00 - PACKAGING AND MARKING

The consignee shall be "The Superintendent, Radio Directorate, Radio-Electrical Project, Ichhevailla, Via Birsa." The letters "RADIO - ELECTRICAL", the Foreign Index and the Foreign Order numbers and the serial identification mark of the Government of Mysore on each box shall be clearly marked on all the packages.

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19.00 - WIRING AND ELECTRICAL CONNECTIONS

All meters shall be directly connected to the apparatus driven and shall be suitable for operation on either (i) 415 Volts, 50 cycles, A.C., (ii) 230 Volts, single-phase, 50 cycles, A.C., or (iii) 110 Volts, A.C. supply as required.

20.00 - TESTING

All calculations shall be done after calibration by the locally trained. Threads and bolts shall be so made that after tightening the nut shall be a 1/2 inch and that they can be turned through the length of the threads of the bolt and 1/2 inch, with no trouble of developing the full strength of the bolts.

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21.00 - TROPICAL WEATHER:

The equipment will be subject to operation under an ambient temperature of 45°C for air and 25°C for water and very high relative humidity. All the equipment shall therefore be designed and treated for normal life, and satisfactory operation under the hot and humid climatic conditions prevalent at the site and shall be dust and vermin proof. The equipment shall be given a special treatment for tropical conditions.

22.00 - MARKING OF PARTS:

To facilitate identification at destination and erection, the several parts of the plant and equipment shall be suitably tagged before shipment with cross reference to the relevant assembly drawings.

23.00 - DRAWINGS:

Three sets of drawings certified for construction work at site including detailed foundation drawings shall be despatched by the contractor within three months after order is placed and all details supplied. Three further sets of prints and one set of tracings on cloth or velograph shall be supplied at the time of shipment. One additional cloth bound copy certified as contract drawing shall also be supplied.

Schematic diagrams of all piping systems, control, instrumentation, protection and alarm system and wiring diagram for all electrical circuits shall also be furnished.

Foundation drawings of all component parts of the plant showing the details of the foundation required for these parts and of all ducts, trenches, etc., required for pipes, cables and other accessories. The drawing shall contain all the information required by the ^{Government} purchaser for designing of civil works.

Separate drawings of all important components parts of the plant showing the details, mode of fastening, etc., shall also be provided.

Three prints with dark lines on a white background shall be furnished of each drawing submitted for approval. The copy will be returned to the contractor marked "Approved", "Approved with corrections indicated" or "Examined and Returned for correction". Upon receipt of prints which have been "Approved", the contractor shall furnish without delay six (6) additional prints of each drawing with dark lines on a white background.

If minor revisions are made after a drawing has been approved, the contractor shall furnish six (6) additional prints subsequent to each revision. No major revision affecting the design shall be made after a drawing has been "Approved" without representing the drawing for normal approval.

The purchaser shall have the right to require the contractor to make any changes in the design which in his opinion is necessary to fulfill the specification requirements without any extra cost to the ^{Government} purchaser.

24.00 - INSTRUCTION & SPARE PART BOOKS:

The contractor shall supply (six copies) free of cost upon completion of the work.

- a) Full instructions for the operation and maintenance of all parts.

25.00 - T E S T S:

Test to be made before shipment:- The following tests shall be conducted by the contractor before shipment of the equipment.

- a) All pipes, valves, fittings, governor, pressure tanks and other components of the governing system shall be tested under a pressure maintained at 150% of maximum working pressure for not less than half an hour and the equipment shall withstand the pressure without showing any sign of leakage, damage or failure.
- b) Complete governor shall be assembled at the manufacturer's works and tested to ensure correct operation, and all motors, pumps and other auxiliary equipment shall be tested in accordance with the relative approved standards.
- c) Main valve shall be assembled and tested:-
 - i) At a pressure 75% over and above static head for 30 minutes.
 - ii) For satisfactory operation over the entire range of closing and opening as specified.

- d) Any other tests and inspections on the equipment covered by the contract the purchaser may consider necessary to satisfy themselves that they comply with the specification in performance, workmanship, design and quality of material.

No shipment of any portion of the equipment shall be made till the test certification conducted at the factory are approved by the ^{Government} purchaser or his representative. The advance copy of the test certification shall be sent for approval of the ^{C.E. H.C.P.} purchaser by Air Mail.

Five additional copies to furnish in due course. The ^{Government} purchaser reserves the right to check the test results by repeating any or all of the above tests after the turbines have been received and installed at site. They also reserve the right to test the other characteristics of turbine, governors and other equipment in order to verify the performance details such as speed regulations, pressure variation, etc., as stipulated in the specifications.

Tests at site:- To verify whether the guarantee regarding output and efficiency are within specified limits after the turbines are erected at site, tests shall be conducted at site. Any other tests other than the acceptance tests such as turbine regulation test, speed rise test, runaway speed test, etc., shall be conducted by the ^{Government} purchaser, if necessary.

For checking the guarantee, the test shall be carried out in accordance with the latest A.S.M.E. Test Code. The output however to be guaranteed with a measurement tolerance of 1% and a rejection limit of 5%. For the measurement of efficiency the pressure tapping for the measurement of head shall be at the entry to the spiral casing as stated in Contractor's letter No. F 129/1913 dated 7th May 1930.

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REVISIONS TO THE SPECIFICATIONS.

Cl. Clause & No. Para No.	Deviation by the tenderer.	Justification by the tenderer.
1. 2.05.06	<u>Draft tube lining</u> The upper part of the draft tube near the discharge from the runner shall be lined with stainless steel in order to minimize the effect of cavitation.	The discharge ring in fact incorporates the upper part of the draft tube as can be seen on drawing 193.502 and it is made of stainless steel. It is therefore needless to provide any part of the draft tube lining in stainless steel.
2. 2.05.07	<u>Guide wheel cover-</u> The shall be of cast steel with removable protecting rings of wrought iron or cast steel.	The guide wheel cover or the top cover shall be of welded steel plate construction for all the Kaplan turbines. The cast steel cover offers no advantage and leads to lengthy deliveries of the equipment since the manufacturer is bound by the foundry deliveries. As regards labyrinth seals, they shall be provided in part of the carbon seal as seen on drawing 193.502. Facing plates at the top and bottom covers are not essential for Kaplan turbines since they operate under low heads.
3. 2.05.09	<u>Cavitation Guarantee and penalty.</u>	Instead of calculating the cavitation guarantee on the basis of the values in 2.05.09 of the following criteria is preferred. The loss of material shall not be more than the figures derived from the following formula. The duration of the guarantee would be either 3300 hours or 12 months whichever be the shorter. Loss of material ϕ in the runner in ϕ 6,0 D ² pounds. ϕ Loss of material ϕ in the discharge ϕ 0,4 D ² ring in pounds. ϕ (here D = Diameter of the runner in feet. This formula is valid for Kaplan turbines only.

During the period of the guarantee the operation of the turbine at over load and partial loads less than 50% of the rated output would be restricted to 500 hours only.

4. 2.05.11 Guide Apparatus:-
The movable guide vane shall be of stainless steel and the spindles and vanes shall be cast in one piece and be easily accessible for replacement.
5. 2.05.14 (9) Start by oil pump out for the entire power station.
6. 2.05.15 S h a f t.
7. 2.05.19 The complete rotating element shall be tested for 5 minutes at the generator manufacturer's works before shipment.
8. 2.02.07 Runaway Speed:-
The turbine shall be tested by the manufacturer by actually running it for 5 minutes at the manufacturer's works.

It is not considered necessary to provide the guide vane of stainless steel. This provision would be justified for a medium head of high head Francis turbine but with a Kaplan turbine which operates under low heads ordinary cast steel guide vane would quite satisfy the requirement. The extra price for stainless steel guide vane has been given in the quotation.

Supplying of a stand by set for each unit instead of one unit for the entire power station is preferred.

Normally the turbine shaft is not built to the generator manufacturer for effecting the alignment. The alignment shall be done by means of a drilling template which can be sent by the turbine manufacturer to the generator manufacturer or vice versa.

It is not necessary to do the tests on the thrust bearing at the manufacturer's works. The thrust bearing shall be correctly machined and surfaced and the final runaway speed tests if required shall be done at site.

It is not possible to erect a Kaplan turbine completely at the manufacturer's works. However, subjecting the turbine to runaway speed tests after the erection of the turbine at site is acceptable.

Unit.	Percentage full load output.					Output at a gross head of - ft -					Efficiency at a gross head of - ft -					
	164	160	150	140	130	120	110	99	164	160	150	140	130	120	110	99
17000 at overload																
D H P max. 15%	19500	19500	19500	19500	19500	19500	19500	19500	90.5	90.4	90.1	89.9	88.1	86.0	86.8	-
Full load output 100	17000	17000	17000	17000	17000	17000	17000	17000	91.2	91.6	91.5	90.8	90.4	89.6	88.2	86.5
+15%																
90	15500	15500	15500	15500	15500	15500	15500	15500	91.6	91.4	91.7	91.6	91.3	90.6	89.8	88.2
+15%																
80	13600	13600	13600	13600	13600	13600	13600	13600	90.5	90.6	91.5	91.7	91.6	91.4	90.6	89.4
+15%																
70	11900	11900	11900	11900	11900	11900	11900	11900	89.2	89.7	90.5	91.5	91.6	91.6	91.1	90.2
+15%																
60	10200	10200	10200	10200	10200	10200	10200	10200	87.8	88.2	89.2	90.2	90.8	91.2	91.1	90.2
+15%																
50	8500	8500	8500	8500	8500	8500	8500	8500	83.4	87.0	87.9	88.5	89.8	90.2	90.2	89.3

Note:- a) The outputs and efficiencies are not guaranteed for percentage gate openings but as fractions of load at any given head.

b) The efficiencies under outputs lower than 5/10 full load for any head, are not guaranteed.

c) Efficiencies and outputs for all heads excepting the rated head are purely indicative and are not guaranteed.

d) The turbine shall be capable of delivering outputs to the extent of 15% over and above the rated output at the maximum head and proportionately higher outputs between maximum and rated head.

e) The efficiencies indicated under the gross heads of 164, 160 and 150, feet refers to the outputs without the 15% extra capacity.

- Note:- a) The outputs and efficiencies are not guaranteed for percentage gate openings but as fractions of load at any given head.
- b) The efficiencies under outputs lower than 5/10 full load for any head, are not guaranteed.
- c) Efficiencies and outputs for all heads excepting the rated head are purely indicative and are not guaranteed.
- d) The turbine shall be capable of delivering outputs to the extent of 15% over and above the rated output at the maximum head and proportionately higher outputs between maximum and rated head.
- e) The efficiencies indicated under the gross heads of 164, 160 and 150, feet refers to the outputs without the 15% extra capacity.

Unit.	Percentage full load output.	Output at gross head of -				Efficiency at gross head of -			
		71	80	90	ft - 30	19	71	80	90
10.150	100	10150 ^{7/8}	10150	6150	6100	1900	80.5	87.5	90.0
	90	9130 ^{7/8}	7340	5430	5390	1350	81.0	80.5	83.6
	80	8120 ^{7/8}	6520	4000	3230	1200	81.6	81.0	80.5
	70	7100 ^{7/8}	5710	4270	3370	1050	81.6	81.6	80.6
	60	6090 ^{7/8}	4900	3600	2630	900	81.3	81.5	80.3
	50	5030 ^{7/8}	4070	3050	2050	750	80.5	80.0	80.9

- Notes- a) The outputs and efficiencies are not guaranteed for percentage gate openings but as fractions of load at any given head.
- b) The efficiencies under output lower than 5/10 full load for any head are not guaranteed.
- c) Efficiencies and outputs for all heads exceeding the rated head are purely indicative and are not guaranteed.
- d) The turbine shall be capable of delivering outputs to the extent of 15% over and above the rated output at the maximum head and proportionately higher outputs at heads between maximum and rated head.
- e) The of 101500 indicated under the gross head of 71 ft. head refers to the outputs without the 15% extra capacity.

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WITH reference to the contract entered into between the Governor of Mysore represented by the Chief Engineer, Hydro-Electric Construction Projects of Mysore hereinafter called the Purchaser and M/s. Etablissements Koyrpic, Avenue De Beauvert Grenoble, France, hereinafter called the Sellers, for the supply of Hydraulic Turbines, Valves, Automatic Governors and Associated Equipment required for Bhadra Project by the Sellers at a total cost of £ 290,544-0-0 the purchaser have agreed to make payments as follows:-

The first payment of 30% FOB prorata value -- against presentation of shipping documents under confirmed irrevocable letter of Credit established with our French Agents in Paris (Chase Manhattan Bank Paris). Part shipments are allowed.

The balance of 70% of FOB value (amount) to be paid in Ten half-yearly instalments (Ten instalments) detailed as under will carry interest at 6% per annum

Instalment	Interest approximate amount.	Approximate Total amount payable.	Due Date of Payment
1st			
2nd			
3rd			
4th			
5th			
6th			
7th			
8th			
9th			
10th			

NOTE: Payments as in 2 to 10 both inclusive shall be made to the seller after receipt of shipping documents of the last consignment.

Interest will be calculated with effect from 17-7-1960 (24 months after from the date of receipt of import licence). Unless the delivery period is extended by mutual agreement. In the latter event the interest will accrue from the date inclusive of the extended delivery period in which case payments of instalments 1 to 10 will be correspondingly deferred. The amounts of interest due shall be payable with each instalment. We hereby guarantee that the ten half-yearly instalments falling due in the dates stated above shall be paid to the Seller by us through their Bankers.

We firm that we hold an Indian Exchange permit to remit to Messrs. Koyrpic, Grenoble France Through their Bankers for all payments against this order as stated above. We further confirm that the above payments with interest will be made to Messrs. Koyrpic, Grenoble, France through their Bankers at due dates.

This guarantee is independent of any disputes that might arise after the supply of the equipment regarding working of the equipment.

This guarantee shall be irrevocable and shall remain in force until 1965.

(SIGNATURE OF GUARANTOR).

79)

FORM OF AGREEMENT

(Local Indent No. F.O. No. 3603-EL-17611-95758)

This agreement made the ~~30th~~ day ~~of October 1963~~ between M/s. Ansaldo - San Giorgio, a firm in Genova, Italy (hereinafter referred to as the "Contractor") which term shall include his heirs and legal representatives and the Governor of Mysore - India (hereinafter called the "State").

AND WHEREAS the State having invited the tenders in the Enquiry No.14921 for the supply of Transformers required to Bhadra Reservoir Hydro Electric Project, and the contractor having accepted to supply the equipment in his letters Nos. E. 3/5304/4 of 26.2.58, E. 3/7661/4 of 21-3-1958, E. 3/9081/4 of 23-4-1958 and E.3/10631/4 of 29-5-58,

AND WHEREAS the Secretary, Stores Purchase committee on behalf of the State having placed an order with the contractor for the supply of "Transformers required for Bhadra Reservoir Hydro-Electric Project" in S.P.C. Letter No.51966 dated 13-3-58 as detailed in the schedule described here-under subject to the conditions and specifications detailed in the said enquiry No. 14921.

AND WHEREAS the Contractor having accepted to supply Ansaldo - San Giorgio's Transformers as herein described in the Schedule and having furnished a security deposit of 5% of the value of this order, in the shape of Bank guarantee from a schedule bank for the fulfilment of contract.

IT is hereby agreed between the parties here to as follows.

1) The contractor shall supply equipment as per details of schedule of equipment and prices (See Annexure).

2) Standards:- The construction and manufacture of Transformers and accessories shall be in accordance with the standards as detailed in specifications and agreed to by supplier.

3) Prices:- The prices given in the order are in Italian Liras for the material delivered F.O.B. port of shipment, and are firm, for prices indicated in Column 8 of schedule of prices.

The sales tax and other local taxes etc. payable in India on the goods supplied, shall be borne by the State.

4) Currency of Payment:- Currency of payment shall be Italian Liras.

5) Terms of Payment:- The payment of price of the equipment shall be made as follows, on presentation of necessary invoices.

- 20% of the contract FOB price when each single lot is ready for shipment
- 16% twelve months after the date of receipt of notice from the contractor that each lot is ready for shipment
- 16% twenty-four months after the aforesaid date
- 16% thirty-six months after the aforesaid date
- 16% forty-eight months after the aforesaid date
- 16% sixty months after the aforesaid date.

An annual rate of interest of six per cent shall be paid by the State on deferred payments beginning from date of receipt of the

Contd...2.

notice from the contractor that each single lot is ready for shipment.

The total amount of interest on all deferred payments shall be paid along with the last instalments to be paid five years after the receipt of the notice from the contractor that each lot is ready for shipment.

For the deferred payments the state shall give a guarantee acceptable to the contractor.

6) INSURANCE:- Suppliers shall contact the Trade Agent for the Government of Mysore, 28, Cockspur Street, London S.W.I., well in advance, and the Trade Agent shall arrange for the necessary insurance and shipment of equipment from the port of shipment to destination.

7) Delivery:- The F.O.B. delivery of the equipment shall be made on dates shown below against each item of equipment.

15 MVA	transformers	25-9-1959
9 "	"	25-5-1959
2.5 "	"	25-5-1959

8) Penalty for late delivery:- The Contractor shall be liable for penalty for late delivery of the material at $\frac{1}{2}\%$ of the contract price per week reckoned on the contract value of each complete unit delivery of which has been delayed.

The maximum penalty payable shall however not exceed 10% of the FOB value of each delayed unit.

Amongst the causes of force majeure the following also shall be included:

- a) non availability of ships for loading when the transformers are made ready at Contractor's works.
- b) delay of the State in approving the test certificates beyond (15 days) from the date of receipt of such certificates.
- c) delay in carrying out the inspection by State's officer or representative beyond reasonable time.

9) Schedule of Technical particulars:- Shall be as per the schedule of Technical particulars appended ~~in the order form, modified for items 8 and 9 - existing current.~~

10) Guarantee:- The contracting firm shall be responsible for replacing at site and free of cost any parts of plant and equipment that may prove faulty or fail by reasons of any of the clauses a, b and c stated below within one year after the plant has been put into operation by the state or 30 months after the shipment, whichever is earlier.

- a) Quality and strength of material used.
- b) Adequate factors of safety for all parts of the equipment to withstand the mechanical and/or electrical stresses developed therein.
- c) Suitability of design and workmanship of the plant for conditions envisaged in these specifications.

11) Training of Engineers:- Necessary facilities shall be provided in the manufacturer's works for training two Engineers deputed by the State in the manufacture, assembly and testing of equipment for a minimum period of one year. During the stay of the said Engineers at the manufacturer's works, each of them shall be paid It. Liras 100,000 (£.Stg.57) per month by the Contractor. charges for boarding and lodging shall not be the responsibility of the contractor. Tourist class air ticket for the return journey of the said Engineers up to Bombay shall be borne by the contractor

12) Erection:- Erection shall be carried out by the Engineers of the State. However the suppliers shall provide free of charge the supervision of erection, which shall last for the period of erection of the equipment as well as for field tests.

13) The conditions stipulated in the said S.P.C. Enquiry No. 14921 form part of this agreement, except for clause 5. of the conditions (page 1) which shall not apply.

14) Packing:- The materials shall be securely packed so as to withstand rough handling in transport over land and sea.

15) Accessories: Each transformer shall be provided with the following accessories:-

External heat exchangers, complete with valves for adjusting and closing the water and oil circulation.

Electrical pumps for the oil circulation suitable for 230 - V, 50 Cycles, single phase or 400 Volts, 50 Cycles, 3 phase.

Piping to couple tank, pump coolers or heat exchangers.

Device for remote indication of water and oil circulation failure.

Oil conservator with two closing cocks, settled so as to be removed filled with oil; plug, drain valve and air intake.

Oil sampling cock.

Drain valve.

Regulation and safety valve, with alarm contacts.

Two threaded joints for connection to the oil filter, one on the upper and one on the lower parts of the tank.

Dial ~~threaded joints for connection to the~~ thermometer with indicator and insulated contacts, adjustable according to the maximum safety oil.

Lifting lugs for the whole core.

Note: All Constructional details not specified here in and referred to - core - tank - windings - busings - protections, etc., shall be in the compliance with the tender specification requirements. The equipment shall be complete with spares as indicated in Column 6 of the Schedule of Prices.

Name-plate and diagram of connections, with workings in English.

Set of sliding wheels with a single flange, suitable for bi-directional transport of the transformer.

Bucholz relay

Winding temperature indicator.

16. TESTS:

The suppliers shall furnish copies of test certificates of materials used for construction, and also on the prescribed tests (vide Clause ~~4.15~~ 4.15 of specifications) conducted on the equipment after manufacture and assembly in their works. They shall provide full facility for inspection by other officers or representatives appointed by the purchaser for the purpose during the course of manufacture, assembly and testing. They shall also forward monthly progress report on manufacture of various equipment ordered. Two advance copies of the test certificates shall be sent for the purchaser's approval by Air Mail. The equipment shall not be shipped before the purchaser's approval for the test certificates is received. 4 additional copies of the test certificates shall be despatched along with the shipping documents.

17. DRAWINGS:

Three sets of detailed drawings, certified for construction work at site, shall be despatched by the contractor within two months after the order is placed and all details are supplied. Three further sets of prints and one set of tracings on cloth or velographs shall be supplied at the time of shipment. One additional cloth bound copy, certified as contract drawings, shall also be supplied.

18. INSTRUCTION BOOKS:

Instruction books in triplicate, containing full INSTRUCTIONS FOR OPERATION and maintenance of the plant shall be supplied free of cost, sufficient in advance of shipment of the material.

IN WITNESS WHEREOF the parties of this agreement have signed this indenture in the presence of the following witnesses.

Witnesses:

Contractor
In the name of and under the Direction
of the Governor,

PURCHASER

Designation.

83)

5. SCHEDULE OF EQUIP

Description.		Qty. required.	Basic price quoted FOB. (A)	Increase in price for providing conde bushings, vide lett RM/E-460/10-5-1957
1.	2.	3.	4.	5.
1.	15,000 KVA, 50 Cycles, 3 Phase, 11,000-66,000 Volts, Delta-Star, forced oil, water cooled, transfor- mers with +2.5% +5% +10% taps on H.T. Windings, etc., complete for outdoor instal- lations.	Three	Italian Liras 55,125,000	Italian Liras 304,500
2.	Oil for first filling +10% extra in sealed non-returnable drums	for three tran- sformers	1,417,500	---
3.	9,000 KVA, 50 cycles, 3 Phase, 11,000-66,000 Volts, Delta-Star forced oil water cooled tran- sformers with +2.5% +5% +10% taps on H.V. windings, etc., complete for outdoor installation.	One	14,262,500	101,500
4.	Oil for first filling+ 10% extra, in sealed non- ret. drums.	For one transf.	411,250	---
5.	2,5000 KVA 50 cycles, 3- phase 11,000-66,000 volts Delta Star self-cooled transformer with +2.5% + 5% +10% taps on H.V. wind- ing etc., complete for out- door install.	One	8,540,000	101,500
6.	Oil for first filling +10% extra, in sealed non- returnable drums.	For one tran- sformer	350,000	---

ENT AND PRICES.

ser r B)	Spares (C)	Total price i.e., (A plus B plus C)	Increased price to make Prices firm vide lotter No. RM/E-460/12367 dated 6th August 1957.
----------------	---------------	---	--

6.

7.

8.

- Two busings 66KV = 321,417	Italian Liras 58,330,417	Italian Liras 62,705,193
- One winding column with oil = 2,520,000		
- Two bushing 11 KV = 26,250		
- Six sets of glasses for air vent = 1,750		
- One set of pack- ing = 31,500		
---	1,417,500	1,523,813

- One winding column complete with oil " 1,750,000	16,147,250	17,358,294
- Six sets of glasses for air vent = 1,750		
- One set of pack- ing. = 31,500		
----	411,250	442.094

- One winding column complete oil=1,015,000	9,674,000	10,399,550
- Six sets of glasses for air vent= 1,750		
- One set of packing = 15,750		
---	350,000	376,250

92,805,199/-
Italian Liras

84)

Extra cost for Impulse Test:-

Impulse test on 15 MVA transformer	Italian Liras
- do - - ac9- " "	"
- do - 2.5 " "	"

Extra cost for heating test:-

Heating test on 15 MVA transformer	Italian Liras
- do - 9 " "	"
- do - 2.5 " "	"

Note:- The impulse and temperature rise tests on the transformers on specific instructions from the Purchaser at the extra cost above schedule.

01,250 per transformer.

33,750 "

40,000 "

6,250 per transformer

7,500 "

10,000 "

shall be performed only
as indicated in the

85)

SCHEDULE OF TECHNICAL PARTICULARS:

Item No.	Description.	15,000 KVA.	9,000 KVA.	2,500 KVA.
1.	2.	3.	4.	5.
1.	Maker's name and country.	ANSALDO	SAN GIORGIA, ITALY.	
2.	Normal full load output for 60°C temperature rise - KVA.	15,000	9,000	2,500
3.	Continuous output, B.S. rating - KVA.	-	-	-
	Vector group number as per B.S.S.	-	32 Yd 1	-
4.	Maximum temperature rise after full load run followed by two hours overload of 25 per cent (Ambient 45°C) :			
	a) of oil by thermometer °C	-	55	-
	b) of windings by resistance °C	-	65	-
5.	Core loss at normal voltage and frequency - KW.	13	13.6	6
6.	Core loss at 110 per cent voltage and normal frequency - KW.	24.6	16.6	8.3
7.	Copper loss at normal full load current - KW.	90	60	21.5
8.	Exciting current at normal voltage 0.9 and frequency - %.	~~0.4~~	~~0.45~~	~~0.7~~
9.	Exciting current at 100 per cent voltage and normal frequency - %.	~~1.6~~	~~1.2~~	~~2.8~~
10.	Power factor of exciting current at normal voltage and frequency.	0.3	0.33	0.34
11.	Efficiency at 75 °C -			

(In the efficiency calculations,
the rating absorbed by the motor
pump for forced oil circulation in
relation to the solution with water
cooling of the 15,000 and 9,000 KVA
transformers has not been taken into
consideration.)

Contd....

(56)

1.	2.	3.	4.	5.
a) on 100% load 1.0. P.F.		99.28	99.19	98.81
b) on 90%	-do-	99.33	99.23	98.97
c) on 80%	-do-	99.37	99.23	99.04
d) on 70%	-do-	99.41	99.32	99.06
e) on 60%	-do-	99.44	99.35	99.09
f) on 50%	-do-	99.45	99.37	99.10
12. Zero sequence impedance ohms.	Zero sequence impedance will be specified at the time of final design.			
13. Reactance drop on full load - %.		8.98	8.97	7.96
14. Resistance drop on full load - %.		0.6	0.667	0.86
15. Impedance drop on full load - %.		9	9	8
16. Regulation at full load 1.0 P.F. - %.		1.00	1.07	1.18
17. Regulation at full load 0.85 P.F. - %.		5.51	5.55	5.11
13. Tappings on H.T. windings - %.		-----2.5%, 5%, + 10%-----		
19. a) Maximum flux density in the core with normal voltage and frequency CGS Lines/Sq. Cm.		-----	15,500	-----
b) Maximum flux density in the core at 110% voltage and normal frequency CGS Lines /Sq.Cm.		-----	17,050	-----
20. Maximum current density in copper of the H.T. windings-- Amps/Sq.mm.		2.85	2.82	2.75
21. -do- L.T. windings -Amps/ Sq.mm.		2.85	2.82	2.75
22. Minimum clearance to earth:-				
a) of L.T. winding in oil.		-----	85 mm	-----
b) of H.T. winding in oil.		-----	85 mm	-----
23. Impulse strength of H.T. winding (positive wave) (withstand value) KV.		-----	350	-----
23a. Minimum Dry test voltage for winding - KV.				
24. Nature of insulation of laminations.		-----	Varnish	-----
25. Details of painting at works and at site.		One coat of red-lead paint and 2 coats (one to be applied at site) of ashcoloured linseed oil varnish.		

GOVERNMENT OF MYSORE.

881

Telephone No.

Telegraphic Address: "GOMED"

In Reply Refer to

No. F.O. 2003/-

Encls.

Codes Used:

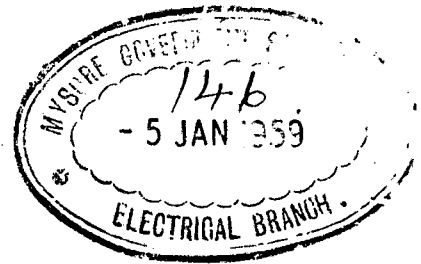
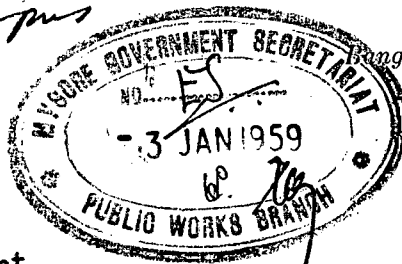
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A. B. C. 6th EDITION

BUSINESS TELEGRAPH CODE

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3 copies

OFFICE OF THE
CHIEF ENGINEER, HYDRO-ELECTRIC
CONSTRUCTION PROJECTS,
POST BAG NO. 60,
RACE COURSE CROSS ROAD,
Bangalore-1, 2nd January, 1959.
(Mysore, S. India)



The Secretary to Government,
P.W & Electricity Department,
BANGALORE.

Sir,

Sub: Bhadra Reservoir Hydro Electric Project - Draft
Agreement for Hydraulic Turbines on order with
M/s. Neyrpic, France.

Further to our letter No. F.O. 2003/G-1209 dated the 15th November 1958, enclosing the contract documents for the above, which was approved by you in your letter number PWD 18 BHE 58 dated 5th December, 1958, we wish to state that the firm requests that sub-clause (b) on page 2 of the agreement be amended as follows to be in line with that given in the Bank Guarantee to be given by the Bank of Mysore.

- b) Balance of 70% of F.O.B. value to be paid in ten half-yearly instalments detailed as under will carry interest at 6% annum.

<u>Instalment</u>	<u>Interest approximate amount</u>	<u>Approximate Total amount payable</u>	<u>Due date of payment.</u>
1st			
2nd			
3rd			
4th			
5th			
6th			
7th			
8th			
9th			
10th			

NOTE: Payments as in 2 to 10 both inclusive shall be made to the Contractor after receipt of shipping documents of the last consignment.

Interest shall be calculated with effect from 17-7-1960 (24 months from the date of receipt of import licence), unless the delivery period is extended by mutual agreement. In the latter event the interest shall accrue from the date inclusive of the extended delivery period in which case payments of instalments 1 to 10 shall be correspondingly deferred. The amounts of interest due shall be payable with each instalment. The Bank of Mysore shall guarantee that the ten half-yearly instalments falling due in the dates stated above shall be paid to the Contractor through their Bankers.

Three copies of the revised Agreement form are enclosed herewith. I would request you kindly to convey approval for this also at an early date since the Bank Guarantee letters have to be opened immediately.

Yours faithfully,

H. Narayanaiah
CHIEF ENGINEER,
Hydro-Electric Construction Projects,

16155
1804258
R.D. 15/11/58
R 8/12

CF 81

CF-845

2/10
3/11

THIS agreement made this.....day of.....1958 between Establishments Neyrpic, Avenue De Beauvert, Grenoble, France (hereinafter referred to as the "Contractor"), which term shall include its successors and legal representatives and the Governor of Mysore (Hereinafter called the "Government").

And whereas the Government having invited the tenders in Stores Purchase Committee Enquiry No.14919 for the supply of "Hydraulic Turbines, Valves, Automatic Governors and Associated Equipment" for Bhadra Reservoir Hydro-Electric Project and the contractor having offered to supply certain equipment in its letters -

1. No.T-529/1916 dated 7th May 1957
2. No.EB-PFa/GPB dated 4th October 1957
3. No.T-529/4560 dated 11th November 1957
4. No.T-529/6542 dated 9th December 1957
5. No.T-529/8674 dated 14th December 1957
6. No.T-529/8766 dated 7th January 1958
7. No.EB-Pfa/ABO dated 29th May 1958

And whereas the Secretary, Stores Purchase Committee on behalf of the State having placed the order with the Contractor for the supply of Hydraulic Turbines, Valves, Governors and associated equipment of the Bhadra Reservoir Hydro-Electric Project in SPC/EI.48024 dated 6th January 1958 as detailed in the Schedules described hereinafter and the general conditions and specifications detailed in the said Enquiry No.14919 and the Schedule of Deviations annexed.

And whereas the contractor having accepted to supply the Hydraulic Turbines and associated equipment, as herein described in the schedule and having furnished a security deposit of Rs.----- for the fulfilment of the contract.

It is agreed between the parties hereto as follows:-

1. The Contractor shall supply the Government goods detailed in the Schedules hereunder and the description and quality of the goods shall be as stated in the Schedules. The Government shall pay the contractor for the goods supplied at the prices stated in the Schedule.

2. The security deposit furnished by the Contractor shall be forfeited at the discretion of the Government in the event of non-fulfilment of any of the terms of this contract.

1958.....

...of the Government of Mysore
...the Government of Mysore
...the Government of Mysore

And whereas the Government of Mysore has decided to purchase
Purchase Contract No. 14319 for the supply of "Hydraulic
Turbines, Valves, Automatic Governors and Associated Equipment" for
Bhadra Reservoir Hydro-Electric Project and the contractor having
offered to supply certain equipment in its letters -

1. No.T-529/1916 dated 7th May 1957
2. No.TB-77/GPB dated 4th October 1957
3. No.T-529/4560 dated 11th November 1957
4. No.T-529/6542 dated 9th December 1957
5. No.T-529/8674 dated 14th December 1957
6. No.T-529/8786 dated 7th January 1958
7. No.T-529/8786 dated 7th January 1958

And whereas the Government of Mysore has decided to purchase
supply of Hydraulic Turbines, Valves, Governors and associated equip-
ment of the Bhadra Reservoir Hydro-Electric Project in SPC/EL.48024
dated 6th January 1958 as detailed in the schedules described herein-
after and the general conditions and specifications detailed in the
said Indury No.14319 and the Schedule of Deviations annexed.

And whereas the contractor having accepted to supply the Hydraulic
Turbines and associated equipment, as herein described in the schedule
and the contractor has agreed to supply the same in accordance with the
terms of the contract.

It is agreed between the parties hereto as follows:-

1. The Contractor shall supply the Government goods detailed in
the schedules hereunder and the description and quality of the goods
shall be as set out in the schedules. The Government shall pay the
contractor for the goods as set out in the schedules.
2. The contractor shall supply the goods as set out in the schedules
for the purpose of the Government of Mysore and the Government of Mysore
shall be liable for the payment of the goods as set out in the schedules.

THIS agreement made this.....day of.....1958
between Establishments Neyrpic, Avenue De Beauvert, Grenoble, France
(hereinafter referred to as the "Contractor"), which term shall include
its successors and legal representatives and the Governor of Mysore
(Hereinafter called the "Government").

And whereas the Government having invited the tenders in Stores
Purchase Committee Enquiry No.14919 for the supply of "Hydraulic
Turbines, Valves, Automatic Governors and Associated Equipment" for
Bhadra Reservoir Hydro-Electric Project and the contractor having
offered to supply certain equipment in its letters -

1. No.T-529/1916 dated 7th May 1957
2. No.EB-PFa/GPB dated 4th October 1957
3. No.T-529/4560 dated 11th November 1957
4. No.T-529/6542 dated 9th December 1957
5. No.T-529/8674 dated 14th December 1957
6. No.T-529/8766 dated 7th January 1958
7. No.EB-Pfa/ABO dated 29th May 1958

And whereas the Secretary, Stores Purchase Committee on behalf
of the State having placed the order with the Contractor for the
supply of Hydraulic Turbines, Valves, Governors and associated equip-
ment of the Bhadra Reservoir Hydro-Electric Project in SPC/EI.48024
dated 6th January 1958 as detailed in the Schedules described herein-
after and the general conditions and specifications detailed in the
said Enquiry No.14919 and the Schedule of Deviations annexed.

And whereas the contractor having accepted to supply the Hydraulic
Turbines and associated equipment, as herein described in the schedule
and having furnished a security deposit of Rs. for the fulfil-
ment of the contract.

It is agreed between the parties hereto as follows:-

1. The Contractor shall supply the Government goods detailed in
the Schedules hereunder and the description and quality of the goods
shall be as stated in the Schedules. The Government shall pay the
contractor for the goods supplied at the prices stated in the Schedule.

2. The security deposit furnished by the Contractor shall be
forfeited at the discretion of the Government in the event of non-
fulfilment of any of the terms of this contract.

THIS agreement made this.....day of.....1958
between Establishments Neyrpic, Avenue De Beauvert, Grenoble, France
(hereinafter referred to as the "Contractor"), which term shall include
its successors and legal representatives and the Governor of Mysore
(Hereinafter called the "Government").

And whereas the Government having invited the tenders in Stores
Purchase Committee Enquiry No.14919 for the supply of "Hydraulic
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6. No.T-529/8766 dated 7th January 1958
7. No.EB-Pfa/ABO dated 29th May 1958

And whereas the Secretary, Stores Purchase Committee on behalf
of the State having placed the order with the Contractor for the
supply of Hydraulic Turbines, Valves, Governors and associated equip-
ment of the Bhadra Reservoir Hydro-Electric Project in SPC/EI.48024
dated 6th January 1958 as detailed in the Schedules described herein-
after and the general conditions and specifications detailed in the
said Enquiry No.14919 and the Schedule of Deviations annexed.

And whereas the contractor having accepted to supply the Hydraulic
Turbines and associated equipment, as herein described in the schedule
and having furnished a security deposit of Rs. for the fulfil-
ment of the contract.

It is agreed between the parties hereto as follows:-

1. The Contractor shall supply the Government goods detailed in
the Schedules hereunder and the description and quality of the goods
shall be as stated in the Schedules. The Government shall pay the
contractor for the goods supplied at the prices stated in the Schedule.

2. The security deposit furnished by the Contractor shall be
forfeited at the discretion of the Government in the event of non-
fulfilment of any of the terms of this contract.

(contd....2)

3. In consideration of the Contractor having agreed to supply the above mentioned equipment, the Government shall make payments as follows:-

- a) 30% of total F.O.B. price of the order under this Contract pro-rata of the value of each consignment against presentation of shipping documents.

Within _____ months from 17-7-1958 the Government shall open an irrevocable letter of credit in Chase Manhattan Bank, Paris (A French Bank in Paris) for 30% of the total F.O.B. price of the order. The letter of credit shall be valid for a period not less than the delivery periods stated hereunder and shall be extended, if necessary.

Against this letter of credit the Contractor shall present the respective shipping documents, made out "to order" of the Government to the above Bank and the Contractor shall be paid 30% of the invoiced F.O.B. value of each consignment.

- b) Balance of 70% of F.O.B. value to be paid in ten half-yearly instalments detailed as under will carry interest at 6% annum

<u>Instalment</u>	<u>Interest approximate amount</u>	<u>Approximate Total amount payable</u>	<u>Due date of payment</u>
1st			
2nd			
3rd			
4th			
5th			
6th			
7th			
8th			
9th			
10th			

NOTE: Payments as in 2 and 10 both inclusive shall be made to the Contractor after receipt of shipping documents of the last consignment.

Interest shall be calculated with effect from 17-7-1960 (24 months from the date of receipt of import licence), unless the delivery period is extended by mutual agreement. In the latter event the interest shall accrue from the date inclusive of the extended delivery period in which case payments of instalments 1 to 10 shall be correspondingly deferred. The amounts of interest due shall be payable with each instalment. The Bank of Mysore shall guarantee that the ten half-yearly instalments falling due in the dates stated above shall be paid to the Contractor through their Bankers.

A Bank Guarantee for the deferred amounts and interests thereon shall be provided by the Government in the enclosed form.

IN WITNESS WHEREOF the parties to this agreement have signed this indenture in the presence of the following witnesses.

Contractor

Witnesses:

In the Name of and under the discretion of the Governor

3. In consideration of the Contractor having agreed to supply the above mentioned equipment, the Government shall make payments as follows:-

- a) 30% of total F.O.B. price of the order under this Contract pro-rata of the value of each consignment against presentation of shipping documents.

Within _____ months from 17-7-1958 the Government shall open an irrevocable letter of credit in Chase Manhattan Bank, Paris (A French Bank in Paris) for 30% of the total F.O.B. price of the order. The letter of credit shall be valid for a period not less than the delivery periods stated hereunder and shall be extended, if necessary.

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<u>Instalment</u>	<u>Interest approximate amount</u>	<u>Approximate Total amount payable</u>	<u>Due date of payment</u>
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A Bank Guarantee for the deferred amounts and interests thereon shall be provided by the Government in the enclosed form.

IN WITNESS WHEREOF the parties to this agreement have signed this indenture in the presence of the following witnesses.

Contractor

Witnesses:

In the Name of and under the discretion of the Governor

DESIGNATION.

SUBJECT

Bhakra Reservoir H.E. Project -
 Draft Agreement for Hydraulic
 Turbine ordered 5th
 M/S Neyric, France.

Diary No. of letter replied to

Section

Hed.

File No.

812D 1812

Serial No.

58

Mysore Government Secretariat.

the

195

Date of issue

20/1/59

No.

To

The Gov. HEP
Blore

Signed by

Sir

With reference to
 your letter No. F-8-2803/
 G-1434 of 2/1/1955 &
 the above subject,
 I am directed to
 state that sub-clause
 (d) of the agreement
 may be amended
 as per the copy herewith
 enclosed.

List of enclosures

Hag T

Copied by

Yours faithfully

Examined by

Mg 20/1

Under Secy to Govt
 by Place Dept
 10/1

91)

GOVERNMENT OF MYSORE.

Mysore Government Secretariat,
No. PWD 18 EHE 58. Dated Bangalore the 2nd Jan. 1959
Pausa Saka Era 1880.

From E-1.

The Under Secretary to the Government of Mysore
Public Works and Electrical Department.

To

The Chief Engineer,
Hydro Electric Construction Projects,
Bangalore.

Sir,

Subject: Bhadra Reservoir Hydro Electric
Project - Draft Agreement for
Hydraulic Turbines ordered with
M/s Neyrpic, France.

- - -

With reference to your letter No. F.O. 2803/G.
1434, dated the 2nd January 1959 on the above
subject, I am directed to state that sub-clause
(b) of the agreement may be amended as per the
copy herein enclosed.

Yours faithfully,

PC

TK

(E. Govindarajulu Nayak)
Under Secretary to Government
P.W. and Electrical Department.

mab.2)

3. In consideration of the Contractor having agreed to supply the above mentioned equipment, the Government shall make payments as follows:-

- a) 30% of total F.O.B. price of the order under this contract pro-rata of the value of each consignment against presentation of shipping documents.

Within _____ months from 17-7-1958 the Government shall open an irrevocable letter of credit in Chase Manhattan Bank, Paris (A French Bank in Paris) for 30% of the total F.O.B. price of the order. The letter of credit shall be valid for a period not less than the delivery periods stated hereunder and shall be extended, if necessary.

Against this letter of credit the Contractor shall present the respective shipping documents, made out "to order" of the Government to the above Bank and the Contractor shall be paid 30% of the invoiced F.O.B. value of each consignment

- b) Balance of 70% of F.O.B. value shall be paid to the Contractor in ten half yearly instalments the first of such instalment being payable 6 months after payment under clause (a). Such instalments shall carry interest at 6 per cent per annum as detailed below:-

Instalment.	Interest approximate amount.	Approximate Total amount payable.	Due date of payment.
1st			
2nd			
3rd			
4th			
5th			
6th			
7th			
8th			
9th			
10th			

NOTE: Payments as in 2 and 10 both inclusive shall be made to the Contractor after receipt of shipping documents of the last consignment.

Interest shall be calculated with effect from 17-7-1960 (24 months from the date of receipt of import licence), unless the delivery period is extended by mutual agreement. In the latter event the interest shall accrue from the date inclusive of the extended delivery period in which case payments of instalments 1 to 10 shall be corresponding deferred. The amounts of interest due shall be payable with each instalment. The Government shall arrange guarantee by the Bank of Mysore Ltd that the ten half yearly instalments falling due in the dates stated above shall be paid to the Contractor through their Bankers.

A Bank Guarantee for the deferred amounts and interests thereon shall be provided by the Government in the enclosed form.

IN WITNESS WHEREOF the parties to this agreement have signed this indenture in the presence of the following witnesses.

Witnesses.

Contractor

In the Name and of and under the direction of the Governor

Designation.

GOVERNMENT OF MYSORE.

93)

Telephone No.

Telegraphic Address: "GOMED"

In Reply Refer to

No. F.O. 2003/B/1494

Encls.

Codes Used:

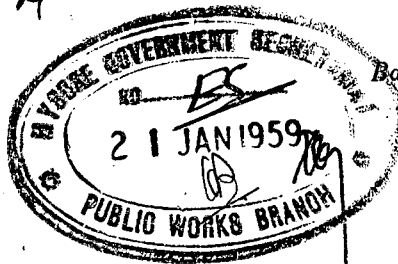
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A. B. C. 6th EDITION

BUSINESS TELEGRAPH CODE

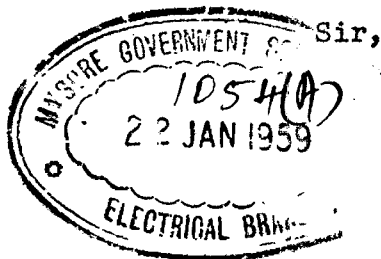
OFFICE OF THE
CHIEF ENGINEER, HYDRO-ELECTRIC
CONSTRUCTION PROJECTS,
POST BAG NO. 60,
RACE COURSE CROSS ROAD,

Bangalore-1, 20th January, 1959.
(Mysore, S. India)



The Secretary to the
Government of Mysore,
Public Works & Electr. Department,
Bangalore.

22/1/59



Sir,

Subject: Bhadra Reservoir Hydro Electric Project
Draft Agreement for Hydraulic Turbines
ordered with M/s. Neyrpic, France.

C.F. 91

With reference to your letter No.PWD 18 BHE 58 dated 20th January 1959, it is noted that certain alterations have been made in paragraph 1 of clause 3(b) as compared with the draft sent from this office. In this connection I wish to state that the equipment is likely to be shipped in several consignments and 30 per cent of the value of each consignment is payable against such shipments. However, the balance 70 per cent of the contract value is payable in ten half yearly instalments, the first of such instalments being payable six months after the last shipment has been made. As such it will be necessary to add the word 'last' in the clause. The modified clause is indicated below:-

"Balance of 70% of F.O.B. value shall be paid to the Contractor in ten half yearly instalments the first of such instalments being payable six months after the last payment under clause (a). Such instalments shall carry interest at 6 per cent per annum as detailed below"

Si J. J.

The addition of the word 'last' is being incorporated in the final contract documents which is arranged to be signed. This is for your kind information.

Yours faithfully,

H. Narayanaiah
Chief Engineer, HCP. 20/1/59